BIOLOGICAL CHARACTERISTICS OF INDONESIAN GAYO HORSE

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Received 5 April 2017 / Accepted 16 July 2019

ABSTRACT

This study aimed to find out the characteristics of Gayo horses and to identify the population of Gayo horses. Data collection was conducted through a selection process from more than 100 local horses distributed in Central Aceh Subdistricts, Gayo Lues and Bener Meriah. The selection process resulted in 30 Gayo horses having varying ages. Detail observation was performed on six Gayo horses consisting of 3 male horses and 3 female horses. The observation comprised morphological observation and morphometry. Data collection of Gayo horse population was based on the annual report from the local Animal Husbandry and Fishery Office of Central Aceh Subdistrict over the last 5 years. Results of this study showed that Gayo horses have a straight *cranial* shape with smaller size, thick and stiff mane, and ears akin to donkey's ears. The study also showed that Gayo horse's body height ranged between 113-120 cm with a body weight range of 215-280 kg. Gayo horse is agile despite living in mountainous areas and able to carry heavy loads. The population of Gayo horses have been declining since 2010-2014. Gayo horse is included in a large pony category. Conservation efforts are essential to save Gayo horse from extinction.

Keywords: characteristics, Gayo horse, hallmarks, population

INTRODUCTION

Indonesian local horses are among livestock commodities supporting national development, especially in the animal husbandry subsector. Gayo horse is one of the Indonesian native horse germplasms (Soehardjono 1990). This has been written in the Ministry of Agriculture Decree No. 1054/Kpts/SR.120/10/2014 which stated that the Gayo horse is an Indonesian native horse strain.

Gayo horse population is spread all over Gayo highland in the Central Aceh Subdistrict, including its autonomous regions called Gayo Lues and Bener Meriah. Central Aceh Subdistrict is known by various other names such as "Nation Above the Clouds", "Gayo Highland" and "*Negeri Antara*". In this region, the annual Gayo traditional horse race was held to commemorate the Proclamation of Independence of the Republic of Indonesia and the anniversary of the Central Aceh Subdistrict. Many owners of Gayo horses have the intention to breed Gayo horse with a thoroughbred horse, creating a new type of horse known as "Astaga horse" (Australia-Gayo). Nowadays, pure Gayo horse is hard to find, which indicated that there might have been a very drastic decline of the Gayo horse population. The attempt to conserve the Gayo horse as one of the Indonesian native horse germplasms must be done immediately to save the Gayo horse from extinction.

The objective of this study is to describe Gayo horses' characteristics and to identify the number of Gayo horses' population, which is crucial for future research concerning the reproduction of Gayo horses.

MATERIALS AND METHODS

Research Procedure

Data collection was carried out by means of direct identification at the Gayo horses' habitat. Additionally, the past and present information on Gayo horses was obtained through direct

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interviews with several owners of Gayo horses and with officials of the local Animal Husbandry and Fisheries Office of the Central Aceh Subdistrict. One hundred local horses were selected from areas surrounding the Central Aceh Subdistrict and its autonomous regions called Gayo Lues and Bener Meriah. In the initial phase, the identification process was conducted according to the criteria written in the Ministry of Agriculture Decree No. 1054/ Kpts/SR.120/10/2014. Of the 100 selected local horses, 30 horses were identified as Gayo horses having varying ages. A more thorough identification process was conducted on 6 Gayo horses consisting of 3 male horses and 3 female horses.

Gayo Horse Morphology and Morphometry

The morphological examination was carried out visually and documented by SLR camera (Nikon D3200, AF-S DX Zoom-Nikkor 18-55mmf/3,5-5,6G ED II). The morphological examination included observation on body shape, eye shape, mane condition, head shape, ear shape, neck shape, nape and tail. Morphometry examination included measurement on body height, girth and body length. Body height was measured from the tip of the front leg up to its withers. The girth was measured from the lower abdomen from the *fossa olecranon* perpendicular with *os sternum* until above *os vertebrae*. Body length was measured from the connection of *cartilago* and *os scapula* horizontally until behind the horse's *os pelvis*. Body weight measurement is predicted by using the Schoorl formula: (Body weight = (chest circumference + 22)^2/100) and measured in kilograms (kg).

Population Data

Data on Gayo horses' population were collected from the annual reports of the years 2010-2014 published by the local Animal Husbandry and Fisheries Office of Central Aceh Subdistrict and its autonomous regions, i.e., Gayo Lues and Bener Meriah.

Data Analysis

Gayo horses' morphology and morphometry data were descriptively analyzed. The population data were analyzed and depicted in graphs. The prediction of Gayo horses' population extinction was analyzed exponentially by using Excel 2016 software.

RESULTS AND DISCUSSION

Gayo horses are included into large ponies for having a body height of not more than 1.47 m. On the other hand, miniature ponies have body height ranging from ≤ 86 cm (A type) up to 88.6 cm (B type) (Campbell 1992). According to Ensminger (1962), a pony's height is less than 1.45 m while standing, with 250-450 kg body weight, and usually are descendants of lightweight horses.

Being included as large ponies, Gayo horses have different body sizes compared to foreign horses. The size differences are often influenced by environmental factors, such as topography and climate (Ohsawa *et al.* 2008; Steinheim *et al.* 2008; Kosoma & Purzyc 2009). Ponies are often used for recreation purposes (Rogers *et al.* 2006), and for therapy programs (Burke 2002).

Generally, Gayo horses have similar characteristics to other local horse types in Indonesia. However, Gayo horses have several uniqueness, such as having straight head shape with smaller body size, thick and stiff mane, and having ears similar to donkey's ears (Table 1; Fig. 1).

Table 1 The morphology of Gayo horses

Morphology	Shape	Color
Body	Short	Black, dun, chestnut, grey, white
Eye	Small	Black
Gaze	Sharp	
Mane	Thick and stiff	
Head	Straight	
Ear	Similar to donkey	
Nape	Long	
Throatlatch	Wide	
Tail	Medium to long	Similar to body color, mix

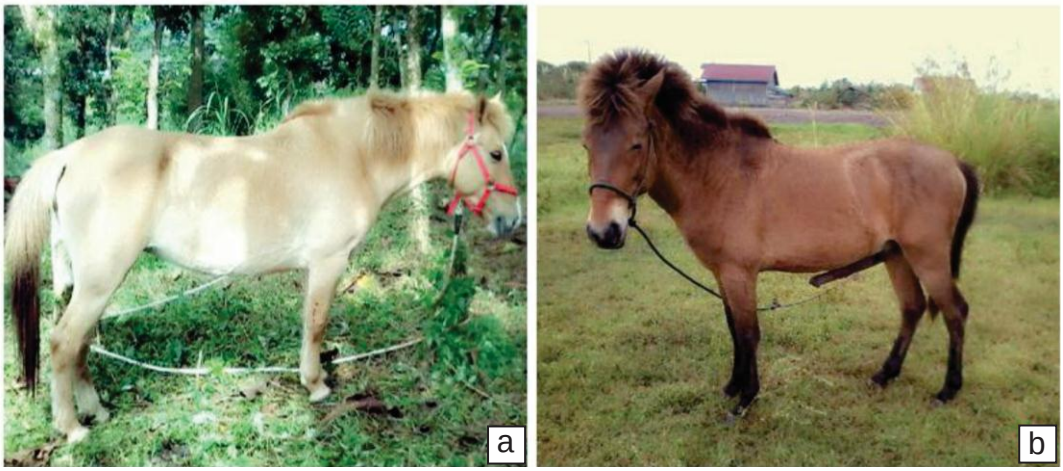

Figure 1 Gayo horse appearance
Notes: a. female; b. male.

Gayo horses have body height of 113-120 cm, chest circumference of 136-139 cm, body length of 102-105 cm, and body weight of 215-280 kg (Table 2). A pictured guide for easy identification of Gayo horse in the field is presented in Figure 2.

Table 2 The morphometry of Gayo horses

Morphometry	Height (cm)	Chest circumference (cm)	Body length (cm)	Weight (kg)
Male	118-120 (119.00±1.00)	137-139 (138.00±1.00)	103-105 (104.33±1.15)	225-280 (256.67±28.43)
Female	113-115 (114.33±1.15)	136-138 (137.00±1.00)	102-105 (103.67±1.53)	215-250 (233.33±17.56)

Figure 2 A pictured guide for easy identification of Gayo horses in the field

Several distinctive marks indicating the temperament and intelligence of local Indonesian horses, which also exist in Gayo horses, are the condition and shape of hair whorl, i.e., 1. *Pusar cekak*; hair whorl under the jaw, indicating that the horse is always being preyed upon by tiger; 2. *Pusar terbang*; hair whorl by the front feet around the left and right knees area, indicating that the horse is suitable as a racehorse due to its fast speed; 3. *Pusar dada*; hair whorl by the chest, indicating that the horse can spin fast and not fall in a sharp turn during a race; 4. *Pusar gedung*; hair whorl by the flank or below the flank, indicating a mild or tame temperament and is suitable as brood; 5. *Pusar turun tangis*; hair whorl under both eyes, indicating temperamental personality, sometimes being tame and sometimes being wild; 6. *Pusar ruk*; hair whorl by the hind legs behind the knees, indicating a wild and hard to control personality; 7. *Pusar lipan*; hair whorl around the throat and under the ear, indicating a hard to control or wild personality.

Gayo horses have several positive characteristics, such as power and agility, having capabilities to carry heavy loads, having good temperament, having good endurance, having high adaptivity toward various environmental conditions, having survival capabilities with minimal feed availability, and having easy maintenance, which makes Gayo horses very economical for its owner. Judging from various aspects, Gayo horses have considerably high strategic values. Based on cultural aspects, the Gayo horse symbolizes social status. Usually, a boy's manhood is determined from the moment a boy can ride a Gayo horse without a saddle in a race, which custom is still practiced nowadays. From an economical aspect, the Gayo horse is used as a source of animal protein for the local people who consume horse meat. Gayo horse is often sold to other regions such as North Sumatra to be consumed. From the utilization aspect, the Gayo horse is used as a plow puller in rice fields and as a freight horse to transport agricultural products. Based on data obtained from the local Animal Husbandry and Fisheries Office of the Central Aceh Subdistrict, the population of Gayo horses drastically decrease in 2010-2014 (Fig. 3).

Prediction analysis indicated that Gayo horse will extinct in 2037 (Fig. 4). Main reasons that might cause the decrease of the Gayo horse population: 1. Crossbreeding; 2. Uncontrolled culling; 3. Existence of modern machinery.

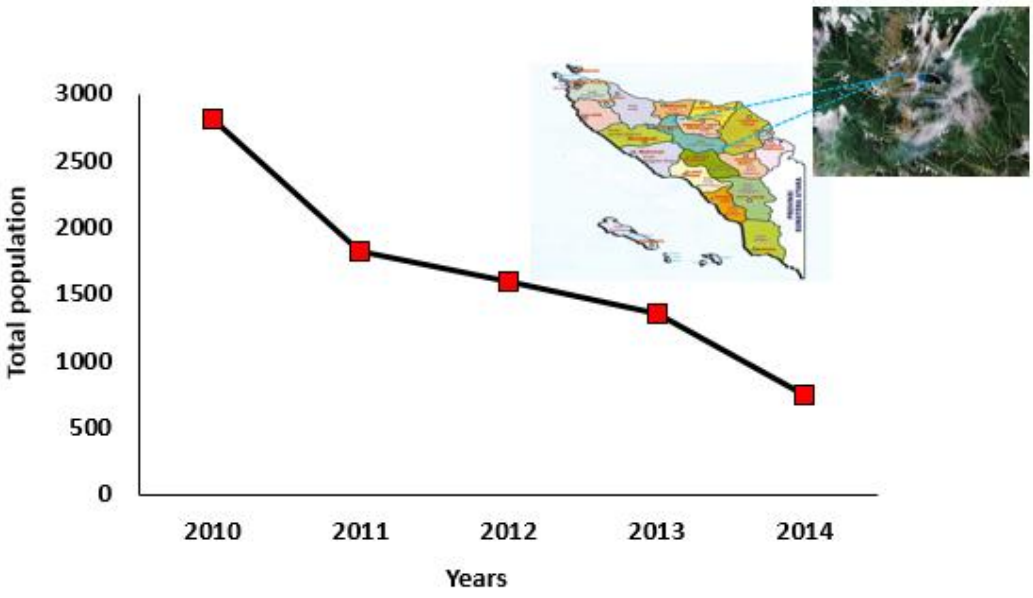

Figure 3 Gayo horses population at Central Aceh Subdistrict

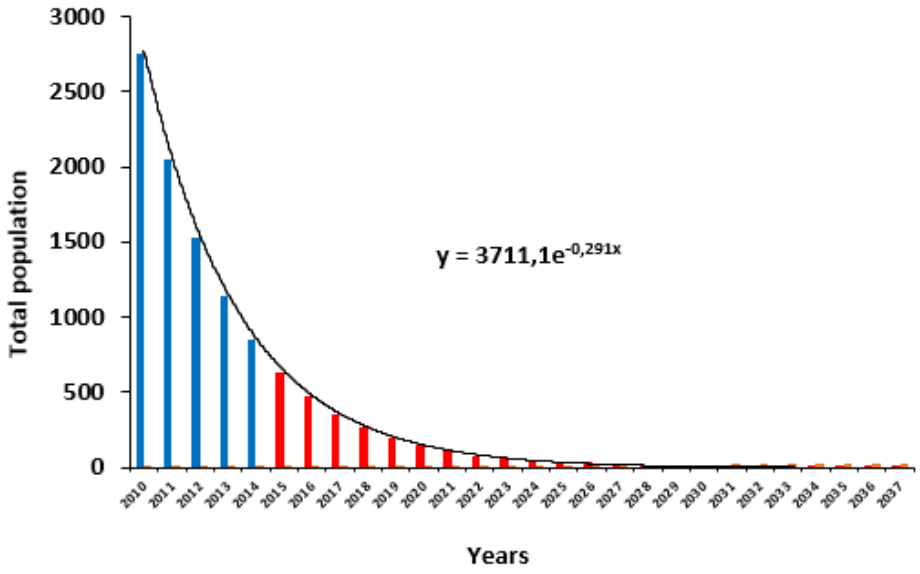

Figure 4 Prediction of Gayo horse extinction

The upkeeping of Gayo horses is usually done conventionally. After the agricultural harvest season, the Gayo horses are released to the mountainous area and rice fields. The mating system of the Gayo horse is akin to that of primates. Only superior stallions may mate with the female horses around the area where the stallion is kept. If a stallion is defeated in a fight before mating, the defeated stallion will be moved to the other group of horses, which causes inbreeding leading to the decrease of body size, height, and weight of Gayo horses. Nowadays, the upkeeping system of Gayo horses has separated the stallion from the mare Gayo horses, even though it is still conventionally conducted. The mare horse is brought to the stallion only at the breeding time.

The body maturity of Gayo horses occurs at 12-15 months of age, while sexual maturity starts at 12-18 months of age (Personal communication with owners). Usually, the mare of the Gayo horse has 21 days of the estrus cycle. All information obtained from owners was proven through complete research on the reproduction status of Gayo horses. Determination of reproduction status is among the most important factor of animal nurturing and breeding management, including for horses, because reproduction status has a close link with animal's basic reproductive physiology. A number of techniques can be utilized, such as ovarium dynamic observation by using ultrasonography (Amrozi *et al.* 2004; Cuervo-Arango & Newcombe 2008; Derar & Hussein 2011; Melia *et al.* 2014), hormonal analysis (Agil *et al.* 2008) and histology examination on reproductive organs. Hormonal analysis in a horse is generally conducted using the horse's blood samples (Bollwein *et al.* 2002; Utt *et al.* 2007; Ginther *et al.* 2010). All of these data can be used as the basic reproductive physiology data of Gayo horses, which will support the application of reproductive technology as one of the means to save endangered the population of Gayo horses from extinction.

CONCLUSION

Gayo horse is included in a large pony category. Conservation efforts are essential to save Gayo horses from extinction.

ACKNOWLEDGMENTS

The authors thank the Directorate of Research and Community Services, Directorate General of Research Development, Technology, and Higher Education, the Ministry of Research Technology and Higher Education for providing research funding through Doctor Dissertation Research Scheme Number: 025/SP2H/LT/ DRPM/II/2016 dated 17 February 2016. Special gratitudes are also delivered to the Central Aceh Office of Animal Husbandry and

Fishery for assisting the authors during data collection process.

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