The characteristics of Sasra cattle, a local cattle from Sragen - Central Java

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Abstract. Efforts to conserve local cattle are important in order to get potential beef-producing cattle. A local cattle from Sragen District—Central Java, commonly referred to Sasra cattle, is one of the potential local cattle that will be developed. This study is intended to identify the characteristics of Sasra cattle, as part of the initial development steps. In 2017, a series of Focus Group Discussion was held by inviting historical actors, leaders, breeders, inseminators, the Sragen Regency Livestock and Fisheries Service officers, and Lembang's Artificial Insemination Center to obtain historical data, characteristics, and farmer community responses related to the Sasra cattle. Body measurements (i.e. chest circumference, body length, and shoulder height) were taken in order to see the cattle performance. Genetical reviews of the molecular aspects have also been carried out. Results of the study showed that based on the history, Sasra cattle were a descent from the hybridization of Aberdeen Angus, American Brahman, and Ongole grade cattle breeds. Based on its phenotype, Sasra cattle could be characterized by the different head to body shape and color if compared to their ancestries, but at a glance, the body shape and color are close to the Angus cattle. There were 10 unique characteristics of Sasra cattle. The quantitative measurement of Sasra cattle is greater compared to that in other local cattle in Indonesia. Molecular evidence show that Sasra cattle have high similarity level to Bos indicus, than to Bos taurus and also confirms that Sasra cattle might have ancestry from Bos javanicus.

1. Introduction

The increase of beef demand is inversely proportional to the availability of cattle that are ready to be slaughtered. Due to the limited of finisher stock, productive bulls and cows were also slaughtered, therefore there is depletion of livestock. This situation resulted in a decline of the national beef cattle population which reached 15.5% [1], and reached 23.7% in Central Java.

Local cattle have been raised in various regions according to their potential. Usually, they were named following the name of the area of origin, such as Aceh cattle, Madura cattle, and Bali cattle; while there is Ongole grade (PO) cattle, a cattle breed that commonly kept by locals in some areas. These local cattle have played a role to be used as a source of domestic beef production in Indonesia, even though it does not fill the whole demand [2].

In order to increase the domestic beef production, it is important to breed quality local cattle, which can be identified by their growth and reproductive performance. Based on those criteria, one of the potential local cattle in Central Java is the Black cattle. This cattle breed commonly kept by farmers in Sragen District and referred as Sasra cattle. However, there are still many people who do not know this
cattle breed, since there is no official decree for this cattle breed, yet. Therefore, we intend to describe the formation history and characteristics of Sasra cattle in this article.

2. Materials and methods

The Sasra cattle characterization were carried out from March to June 2017. A series of Focus Group Discussion was held by inviting historical actors, leaders, breeders, inseminators, the Sragen Regency Livestock and Fisheries Service officers, and Lembang's Artificial Insemination Center to obtain historical data, characteristics, and farmer community responses related to the Sasra cattle. In order to determine the quantitative performance of the cattle, a total 89 Sasra cattle from 5 villages (Wonorejo, Pengkok, Wonokerso, Kedawung, and Kemiri) were identified. Their chest circumference (CC), body length (BL), and shoulder height (SH) were measured by following the recommended procedure for cattle measurement [3]. Historical data and reproductive performance were analyzed descriptively, while data on body size of Sasra cattle were analyzed by means. Genetical reviews of the molecular aspects have also been carried out to support their characteristics.

3. Results and discussion

3.1. Historical origin of Sasra cattle

In 1976 there was a government policy to increase the productivity of local cattle by the introduction of American Brahman and Aberdeen Angus cattle breeds in Indonesia. The frozen semen of those cattle breeds were imported from New Zealand, Australia, Germany, and Canada through the Lembang Artificial Insemination Center and used on the application of artificial insemination (AI) in several provinces, including Central Java.

Sragen regency was designated as one of the targeted area for the program implementation. In the past, PO cattle were the dominant local cattle in Sragen and referred as Bengal cattle. However, AI implementation on this area has changed the composition of cattle population.

In 1976‒1982, the American Brahman semen were used on the initial AI implementation at Tangen, Tanon, Jenar, and Gondang districts, while the Aberdeen Angus semen were used at Masaran district. In 1982‒1992, the Aberdeen Angus semen then used on the next AI implementation at Gondang, Karangmalang, Plupuh, and Kontak Macan districts, where in those areas there have been many cattle population descent from the crosses between PO and American Brahman. Since then, Sragen had a large population of Black cattle. Based on history and the area where Black cattle were originally formed, it is thought that these cattle consist of genetic composition from Aberdeen Angus, American Brahman, and PO.

In 1988‒1989, the Lembang Artificial Insemination Center brought Brangus bulls from Tapos Ranch and started to produce frozen semen from these bulls which was then used for AI in Sragen Regency [4]. That AI program was intended to support the development of Black cattle in Sragen.

3.2. The qualitative characteristics of Sasra cattle

The qualitative characteristics of Sasra cattle are in accordance with the former name that the cattle is black in color from head to tail (see figure 1). In addition, they have no horns and no hump in both male and female, but there is a slight protrusion on the neck in the form of a pile of fat.

Specifically, it can be described that there are at least 10 qualitative traits that are unique to Sasra cattle, i.e: 1) Coat characters: black color, short, thin, and lying down; 2) They have no horns; 3) They have protrudes in the top of the head and hair for males; 4) Long body shape and narrow chest; 5) Wide face and bulging eyes; 6) They have no hump; 7) Slightly wattle hanging from the neck to the chest; 8) Tail characters: small, long, black and thick hair; 9) Small, short, and round shape legs; 10) Large and black udder, shaping like a boat.
3.3. The quantitative characteristics of Sasra cattle

In order to identify the quantitative characteristics of Sasra cattle, their body sizes were measured. The body measurements of livestock could be used to compare variations in size and shape of the animals [6]. Body size has also been used to estimate life weight [7,8].

3.3.1. The quantitative measure for female of Sasra cattle. Body size measurement of Sasra cattle was carried out in densely populated areas, i.e. Wonorejo, Pengkok, Wonokerso, Kedawung, and Kemiri villages. The number of identified Sasra cattle was 15 heifers and 74 cows. The measurement results for female of Sasra cattle are presented in Table 1.

| Age (year) | Cattle number (head) | CC (cm)       | SH (cm)       | BL (cm)       | BW (kg)          |
|------------|----------------------|---------------|---------------|---------------|------------------|
| 1          | 7                    | 149.14±12.64  | 117.14±11.48  | 111.71±10.59  | 275.71±68.45     |
| 2          | 8                    | 162.86±7.85   | 128.63±3.96   | 123.75±8.28   | 350.38±51.24     |
| 3          | 8                    | 168.00±7.52   | 130.50±6.07   | 129.63±7.15   | 385.63±53.47     |
| 4          | 15                   | 173.93±9.64   | 131.27±5.80   | 131.27±8.84   | 427.67±59.49     |
| 5          | 25                   | 173.93±10.0   | 132.64±5.17   | 131.44±8.02   | 410.44±75.70     |
| 6          | 14                   | 173.67±8.28   | 133.43±5.09   | 137.33±4.04   | 419.79±12.94     |
| 7          | 9                    | 175.43±11.12  | 133.45±6.51   | 131.86±7.43   | 428.00±61.06     |
| 8          | 3                    | 183.67±7.02   | 135.67±4.87   | 137.89±7.18   | 502.67±60.86     |

CC: Chest Circumference; SH: Shoulder Height; BL: Body Length; BW: Body Weight

Based on Table 1, it can be seen that the ratio of CC, BL, and SH for Sasra cattle is greater than that of the other local cattle. Following are the averaged CC, BL, and SH, respectively for Aceh cattle: 143.15±14.40, 110.17±6.14, 110.35±15.28 [9]; Bali cattle: 144.30±9.44, 107.90±6.94, 110.80±6.79 [9]; Rambon: 164.37±9.64, 118.88±7.89, 108.21±7.01 [10]; Madura cattle: 142.50±7.00, 114.50±6.14, 116.75±10.24 [11]. The body size of Sasra cattle is higher for CC and SH, but Sasra cattle had a low BL compared to that of PO and Kebumen Ongole grade. Following are the averaged CC, BL, and SH, respectively for PO cattle: 157.32±9.45, 126.08±5.77, 134.97±6.67 [12]; Kebumen Ongole grade: 168.80±8.29, 139.20±5.57, 142.22±7.32 [13]. The chest circumference has a tendency to represent level of body weight, therefore it can be estimated that Sasra cattle tend to have heavier body weight than the other local cattle. For this reason, the development of Sasra cattle as beef cattle in Indonesia is appropriate.
3.3.2. The performance of Sasra cattle bull. It was difficult to find the male of Sasra cattle at the farmer, because after the age of weaning, most of the male calves are directly sold by the owner. Therefore, we described the performance of Sasra cattle bull based on the document in the Artificial Insemination Center - Ungaran (see table 2).

Table 2. The performance of Kebumen Ongole grade and Sasra cattle bull in the Artificial Insemination Center - Ungaran [14].

| Performance parameters       | Kebumen Ongole grade cattle | Sasra cattle |
|------------------------------|-----------------------------|-------------|
| Body weight (kg)             | 796                         | 842         |
| Chest circumference (cm)     | 215                         | 224         |
| Body length (cm)             | 170                         | 174         |
| Shoulder height (cm)         | 155                         | 151         |
| Scrotal circumference (cm)   | 41                          | 43          |
| Yearly semen production (dosage) | 21,404                  | 1,119       |

Based on table 2, it can be seen that the bull’s body size of Sasra cattle is bigger than that of Kebumen Ongole grade cattle. Even though, Kebumen Ongole grade is one of PO cattle line with the high body size in Indonesia. However, a more in-depth study is needed to compare the body size of their males. In the context of cattle development, a total 1,119 dosages of Sasra cattle semen have been produced since 2015. All those frozen semen have been used for AI program in Sragen and only fulfilled 50% of the required amount.

3.4. Technical coefficients of Sasra cattle reproduction
The technical coefficient of cattle reproduction, such as calving interval, days open, and calf mortality are need to be considered on cattle breeding plan. The calving interval of Sasra cattle ranged from 12‒15 months, some are even less than that. The best cow record was giving births on every year until 14 times. Meanwhile, the farmer immediately inseminates the cows after getting signs of heat, around 2 months after giving birth, so that the cow will pregnant in the third month.

Based on the information provided by the farmer, the death of the calves rarely occurs. This might indicate that the milk production of Sasra cow is sufficient to support the growth of the calves. This milk production capability is thought to have been derived from the Aberdeen Angus character, who also has a good body performance. This cattle breed is known to have good mothering ability, early maturing time, and ease of calving [5].

3.5. Genetical reviews of Sasra cattle
There is still limited information of genetical study for Sasra cattle. Even though this study is needed in order to describe genealogy of Sasra cattle, which can be used as basic consideration for their breeding plan. One of the results of this cattle genetic study explains that based on D-loop sequences analysis, Sasra cattle had 85.76% similarity level to Bos indicus than Bos taurus [15]. In previous study using Cytochrome b analysis, most of the Sasra cattle had the similarity of the Cyt b gene with the Bos javanicus and a small portion had similarity with Bos indicus and Bos taurus [16]. All of those studies supported the hypothesis that the Sasra cattle might had the ancestry from Bos javanicus, Bos indicus, and Bos taurus, according to the information obtained from the historical stories.

4. Conclusion
Sasra cattle has unique characteristics due to the qualitative and quantitative performance, especially on their 10 specific merits, body measurements, and reproductive ability. The historical information explained that they were a descent from the hybridization of Aberdeen Angus, American Brahman, and Ongole grade cattle breeds. Genetical studies has provided the initial evidence of that.
References

[1] Dwiyanto K 2013 Focus Group Discussion on The Decline of Cattle Population In Central Java (Central Java: AIAT)

[2] Rusdiana S and Praharani L 2019 Pengembangan peternakan rakyat sapi potong: Kebijakan swasembada daging sapi dan kelayakan usaha ternak Forum Penelitian Agro Ekonomi 36 97–116

[3] Alderson G L H 1999 The development of a system of linear measurements to provide an assessment of type and function of beef cattle AGRI 25 45–55

[4] Lembang Artificial Insemination Center 2001 Annual Report (Lembang: Lembang Artificial Insemination Center)

[5] Adinata Y, Subiharta and Aryogi 2017 Identifikasi fenotipik sapi Peranakan Angus di Kabupaten Sragen Prosiding Seminar Nasional Teknologi Peternakan dan Veterinan (Bogor: Pusat Penelitian dan Pengembangan Peternakan) pp 53–61

[6] Lanari M R, Taddeo H, Domingo E, Centeno M P and Gallo L 2003 Phenotypic differentiation of exterior traits in local Criollo goat population in Patagonia (Argentina) Arch. Anim. Breed. 46 347–56

[7] Shahin K A, Soliman A M, Moukhtar A E 1995 Sources of shared variability for the Egyptian cattle body shape (conformation) Indian J. Anim. Sci. 65 759–64

[8] Yakubu A, Salako A E, Ogah M and Ari M M 2005 Relationship between body weight and chest girth in White Fulani cattle J. Nat. Applied Sci. 1 17–21

[9] Mahmudi, Priyanto R and Jakaria 2019 Karakteristik morfometrik sapi Aceh, sapi PO, dan sapi Bali berdasarkan analisis komponen utama (AKU) J. Ilmu Produksi dan Tek. Hasil Peternakan 7 35–40

[10] Adinata Y and Aryogi 2015 Karakter fenotipik sapi Rambon betina di Kabupaten Banyuwangi Prosiding Seminar Nasional Pengembangan Sumber Daya Genetik Pertanian (Bogor: BBPPTP) pp 512–20

[11] Setiadi B, Dwiyanto K 1997 Karakterisasi morfologis sapi Madura JITV 2 218–24

[12] Sudaryanto A T, Sutopo, Kurnianto E 2018 Keragaman fenotipe sapi Peranakan Ongole di wilayah sumber bibit di Jawa Tengah J. Veteriner 19 478–87

[13] Subiharta, Utomo B, Sudrajad P 2012 Potensi sapi Peranakan Ongole Kebumen sebagai sumber bibit sapi lokal di Indonesia berdasarkan ukuran tubuhnya (Studi Pendahuluan) Prosiding Seminar Nasional Pengembangan Agribisnis Peternakan Menuju Swasembada Protein Hewani (Purwokerto: Universitas Jenderal Soedirman) pp 617–21

[14] Livestock and Animal Health Services of Central Java Province 2016 Annual Report (Semarang: Dinas Peternakan dan Kesehatan Hewan Provinsi Jawa Tengah)

[15] Kusumaningrum R, Sutopo, Kurnianto E 2020 Genetic diversity of Slragen Black cattle based on D-loop gene sequencing analysis Lives. and Anim. Res. 18 124–31

[16] Priyadi D A, Adinata Y, Hartatik T 2016 Analisis filogenetik pada sapi Peranakan Angus Prosiding Seminar Nasional Bioteknologi IV (Yogyakarta: Universitas Gadjah Mada) pp 57–67