Morphometric Traits of Pote Goats Raised in Lowland Areas of Madura Island

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ABSTRACT: This study aimed to investigated the morphometric characteristics of Pote goats, a local Indonesian goat breed found in Bangkalan Regency, East Java Province. A total of 139 respondents participated in the study, providing 622 female and male Pote goats aged over three months as research materials. This study employed a descriptive research method, including surveys and interviews, to retrieve data using purposive sampling technique. Quantitative data, such as body weight and body size, were analyzed descriptively using the average and standard deviation. Qualitative data, including body color, facial shape/profile, horns, beard, papillae, rewos fur, and udder shape, were analyzed using phenotypic frequency. The findings of this study revealed that Pote goats in Bangkalan are a small type of local Indonesian goat based on the body weight of an adult female and a large type based on shoulder height. Body weight and body size were found to increase with age. Furthermore, the dominant qualitative characteristics of Pote goats in Bangkalan include white color on the body, convex facial profile, drooping and widened ears with relatively short size, straight right and left horns, mane ruff, no papillae, and jug-shaped udder.

Keywords: Pote goat; Morphometrics; Quantitative characteristics; Qualitative characteristics

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INTRODUCTION

The genetic resources of local goats in East Java are one of an important factor in achieving East Java's status as the second national goat hub, after Central Java (Direktorat Jenderal Peternakan dan Kesehatan Hewan, 2022). The genetic resources of local goats in East Java include Pote goats, Senduro goats (Palayukan et al, 2020), and Kacang goats (Kusmiati , Subekti, & Windari, 2020). Genetic resources or germplasm are plant, animal, or microbial materials that have the ability to transmit traits from one generation to the next (Amam, Surjowardojo, & Susilorini, 2022). Pote goats are widely found on Madura Island. These goats, with their distinctive white color, are found in 18 sub-districts in Bangkalan Regency and several sub-districts in Sampang, Pamekasan, and Sumenep Regencies. Pote goats are used for both meat and milk production (dual purpose). The origin and ancestry of Pote goats are still unknown. Research and publications related to the production, reproduction, and productivity of Pote goats are also limited. It is suspected that Pote goats are the result of crossbreeding and selection between Etawah crossbred goats and Kacang goats (Disnakjatim, 2019). Pote goats are more closely related to Senduro goats than to Etawah crossbred goats (Susilorini et al, 2022).

Currently, Pote goats are facing threats of population decline and genetic contamination (Noor & Setiyono, 2019; Susilorini et al, 2022). The decline in the Pote goat population is caused by high livestock expenses and a decrease in the interest of farmers in the northern region of Bangkalan to maintain Pote goats (and replacing them with Etawah crossbred goats). The untargeted and poorly programmed crossbreeding between Pote goats and Saanen goats is the cause of genetic contamination and even extinction of local goats (Noor & Setiyono, 2019; Susilorini et al, 2022). Efforts to manage the genetic resources of Pote goats can be started by performing phenotypic, genotypic, and historical characterization (FAO, 2012). Animal phenotypes are influenced by genetic and environmental factors. Phenotypic characteristics consist of quantitative and qualitative traits (Nurgiartiningsih, 2017; Ciptadi et al, 2019). Urgent phenotypic characterization is required to collect data and information on the morphometric characteristics of Pote goats. Furthermore, at the molecular level, morphometric characteristics can be used as a strategy in designing future genetic improvement of Pote goats (FAO, 2012; Hassen et al, 2012). Selection of animals based on phenotypic characteristics can bring positive results in the future. Animal selection needs to consider age, growth rate, body weight, body size, and reproductive health (Purwanti, Setiati, & Kurnianto, 2019; Khandoker, Syafiee, & Rahman, 2016). In light of this context, research on the morphometric traits of male and female Pote goats of various ages is required. The study's findings can be applied to managing Pote goat genetic resources and defining Pote goat characteristics.

MATERIALS AND METHODS

Material, Time, and Location of the Study

The research involved 139 respondents and focused on the female and male Pote goats that were over 3 months old, with a total of 622 individuals (443 females and 179 males). The study was conducted in eight sub-districts, namely: Galis (with low livestock density); Modung, Bangkalan, Arosbaya, Tanah Merah, and Tragah (with moderate livestock density); and Labang and Kamal (with high livestock density). The Bangkalan region is categorized as a lowland area with an altitude of 2-100 meters above sea level. The air temperature ranged from 22°C to 34°C with a relative humidity level of 68% to 83%. The annual rainfall was between 1,200 and 1,800 millimeters per year with 80 to 120 rainy days per year, according to the Central Statistics Agency of Bangkalan (BPS Bangkalan, 2023).
**Research Instruments**

The research instruments employed in this study encompassed a camera, writing tools, population structure and dynamics forms, identification and measurement forms, a universal brand tape measure with a length of 150 cm, a Bravo brand measuring stick made of stainless steel with a length of 210 cm, and a GEA BR Scale manual analog body weight scale with a needle capacity of 200 kg.

**Research Methodology**

a. Preliminary study, consisting of:

1. Field survey, conducted by interviewing and observing to obtain initial information about the population and unique characteristics of Pote Goats so that they can be distinguished from other goats (Etawah crossbred and Kacang goats), and others.
2. Literature review, conducted to obtain references related to Pote Goats in Bangkalan and Madura Island.

b. The measured variables (Figure 1) and weighed and observed (Figure 2) on Pote Goats include:

1. Shoulder height/SH, measured from the highest point of the shoulder (ostium scapula posterior) perpendicular to the floor surface;
2. Hip height/HH, measured from the highest point of the hip (ostium illium) to the floor surface;
3. Body length/BL, measured from the occipital protuberance to the base of the tail bone;
4. Chest circumference/CC, measured by wrapping a measuring tape around the chest just behind the front legs;
5. Scrotum circumference/SC, measured by measuring the widest part of the scrotum;
6. Horn length/HL, measured from the base to the tip of the horn following the direction of horn growth;
7. Ear length/EL, measured from the base of the ear to the tip of the ear;
8. Ear width/EW, measured on the outside of the ear from the left and right sides;
9. Mane ruff length/MRL, done by measuring feathers from the base of the feather to the tip of the feather in the thigh area;
11. Qualitative characteristics (body color, face shape/profile, horns, beard, papilla, mane ruff and udder

Figure 1. Measurement method for the body size of a Pote goat

Figure 2. Weighing and observing Pote Goats

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shape) in Pote Goats were observed and recorded on the form.

c. Data Collection
1. Primary data were obtained from interviews with livestock farmers. Qualitative traits observation and quantitative measurements/weighing were directly carried out on the Pote Goat. Sample data were taken using purposive sampling technique (Sugiyono, 2018).
2. Secondary data were obtained from sources related to the research such as books, journals, and others.

d. Data Analysis
Quantitative traits data of Pote Goat obtained from the research were then analyzed descriptively and presented in the form of mean and standard deviation (Sudarwati, Natsir, & Nurgiartiningsih, 2019). Qualitative traits data of Pote Goat were calculated for their phenotype frequency.

RESULTS AND DISCUSSION

Body Weight (BW) of Pote Goats

The results of body weight measurements are presented in Table 1. Based on Table 1, the mean body weight of female goats in PI 0 (age 3-6 months: 15.93±4.21 kg, age 6-8 months: 19.31±3.68 kg, and age 8-12 months: 23.29±5.43 kg); PI2: 27.62±7.25 kg; PI4: 31.38±7.12 kg; PI6: 33.60±7.91 kg, and PI8: 40.26±8.71 kg. The mean body weight of male goats in PI0 (age 3-6 months: 17.34±4.23 kg, age 6-8 months: 20.82±4.97 kg, and age 8-12 months: 27.71±6.21 kg); PI2: 32.94±12.4 kg; PI4: 38.00±12.62 kg; and PI6: 46.00±15.56 kg. The body weight of both female and male goats increased with age, in line with the findings of (Amam, Surjowardojo, & Susilorni, 2022). Male goats were found to have higher body weights than female goats, ranging from 2 to 13 kg. This study indicates that the body weight of Pote goats is larger than the estimated body weight reported by (Disnakjatim, 2019) of 20-35 kg (female) and 25-40 kg (male).

In 2017, the Ministry of Agriculture declared that the adult body weight of Etawah crossbred goats ranges from 30-45 kg for females and 40-65 kg for males, while Senduro goats weigh 20-35 kg for females and 25-40 kg for males, and Kacang goats weigh 20-35 kg for females and 25-40 kg for males. (Yulistiani & Widyas, 2012) stated that Saanen goats weigh 50-70 kg for females and 70-90 kg for males, and Sapera goats weigh 30-40 kg for females and 40-50 kg for males.

Based on this, Pote goats can be said to have a similar or nearly identical body weight to Etawah crossbred, Senduro, and Sapera goats, but smaller than Saanen goats, yet larger than Kacang goats. The categorization of goats worldwide is evaluated based on the adult female body weight. Dwarf goats have a mature female body weight of 18-25 kg, small goats have a weight of 20-45 kg, and large goats have a weight of 20-65 kg (Alemayehu & Kebede, 2017). In Indonesia, according to (Kusminanto et al., 2020), goats are classified as small (if the adult female body weight is 25-35 kg), medium (if the weight is 35-50 kg), and large (if the weight is over 50 kg). Based on this categorization, Pote goats are classified as small goats according to (Alemayehu & Kebede, 2017) or medium goats according to (Kusminanto et al., 2020).

Shoulder Height (SH) of Pote Goats

The results of shoulder height (SH) measurements are presented in Table 2. According to Table 2, the mean SH of female Pote goats in PI0 (age 3-6 months: 52.63±4.02 cm, age 6-8 months: 55.72±3.56 cm, and age 8-12 months: 60.07±4.13 cm); PI2: 57.58±4.07 cm; PI4: 60.00±4.35 cm; PI6: 65.17±3.55 cm, and PI8: 70.47±4.33 cm. The mean SH of male Pote goats in PI0 (age 3-6 months: 53.26±3.91 cm, age 6-8 months: 57.58±4.04 cm, and age 8-12 months: 63.93±5.66 cm); PI2: 68.00±7.40 cm; PI4: 73.50±10.41 cm; and PI6: 77.50±3.54 cm. The shoulder height of
female and male Poite goats increased with age. The mean SH of males was higher than that of females, with a difference of 1-12 cm. This difference is consistent with the findings of Suparman & Hafid, 2016) that male goats have a higher growth rate than females.

Table 1. Body Weight (BW) of Female and Male Poite Goats in Bangkalan Regency

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number</th>
<th>Districts</th>
<th>Licensed Age</th>
<th>BW (Mean)</th>
<th>Sex</th>
<th>Number</th>
<th>Districts</th>
<th>Licensed Age</th>
<th>BW (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3-6 months</td>
<td>6-12 months</td>
<td>1.5-3 years</td>
<td>3.5-5 years</td>
<td></td>
<td>3-6 months</td>
<td>6-12 months</td>
<td>1.5-3 years</td>
<td>3.5-5 years</td>
</tr>
</tbody>
</table>

Table 2. Shoulder Height (SH) of Pote Goats in Bangkalan Regency

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number</th>
<th>Districts</th>
<th>Licensed Age</th>
<th>SH (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3-6 months</td>
<td>6-12 months</td>
<td>1.5-3 years</td>
<td>3.5-5 years</td>
</tr>
</tbody>
</table>

Source: primary data (2023)

(Sutrisna & Kusnadi, 2018) as well as (Ihsan, 2019) stated that the shoulder height (SH) of adult Etawah crossbred goats ranges from 60 to 70 cm (female) and 65-75 cm (male); (Zulfa, Hamidah, & Suparyogi, 2016) reported that the shoulder height of adult Senduro goats ranges from 60 to 70 cm (female) and 70-80 cm (male); (Yunita & Nurdin, 2021) found that the shoulder height of adult Kacang goats ranges from 45-55 cm (female) and 50-60 cm (male). Based on their shoulder height, Poite goats can be considered almost similar to Etawah crossbred and Senduro goats, but taller than Kacang goats.

The shoulder height of adult female goats can also serve as a basis for categorizing goat types. Dwarf goats have a SH <50 cm, small goats have a SH of 51-65 cm, and large goats have a SH>65 cm (Alemayehu & Kebede, 2017). Therefore, Poite goats belong to the large goat type with

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an average shoulder height ranging from 63.00±4.67 cm to 67.47±4.33 cm.

**Hip Height (HH) of Pote Goats**

The results of hip height (HH) measurements are presented in Table 3. Based on Table 3, the mean HH of female Pote goats in PI0 (age 3-6 months: 52.34±3.87 cm, age 6-8 months: 56.59±4.03 cm, and age 8-12 months: 60.24±4.31 cm); PI2: 63.23±4.54 cm; PI4: 64.38±3.53 cm; PI6: 64.83±3.06 cm at 8 months; and PI8: 66.81±4.34 cm. The mean HH of male Pote (age 3-6 months: 53.51±3.79 cm, age 6-8 months: 57.42±4.26 cm, and age 8-12 months: 63.27±5.82 cm; PI2: 67.33±6.95 cm; PI4: 72.75±10.11 cm; and PI6: 77.00±5.66 cm. The HH of both female and male Pote goats increased with age.

The male HH was higher than the female HH with a difference of 1-13 cm. The back of Pote goats, both female and male, is straight (not convex or concave), based on the comparison of the mean hip height (Table 2) to the mean HH (Table 3), which are relatively similar in height.

### Table 3. Hip Height (HH) of Pote Goats in Bangkalan Regency

<table>
<thead>
<tr>
<th>Livestock Age</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 months</td>
<td>72.75±10.11</td>
<td>77.00±5.66</td>
</tr>
<tr>
<td>8 months</td>
<td>66.81±4.34</td>
<td>70.00±6.19</td>
</tr>
<tr>
<td>12 months</td>
<td>60.24±4.31</td>
<td>64.25±10.87</td>
</tr>
</tbody>
</table>

Source: primary data (2023)

According to (Sutrisna & Kusnadi, 2018) and (Ihsan, 2019), the hip height of adult female and male Etawah crossbred goats ranges from 65-75 cm and 70-80 cm, respectively. Adult Senduro goats have a hip height of 70-80 cm for females and 80-90 cm for males (Zulfa, Hamidah, & Suprayogo, 2016). Meanwhile, adult Kacang goats have a hip height of 50-60 cm for females and 55-65 cm for males (Yunita & Nurdin, 2021). Compared to Kacang goats, the hip height of Pote goats is relatively higher, but still lower than that of Etawah crossbred and Senduro goats.

**Body Length (BL) of Pote Goats**

The results of body length (BL) measurements are presented in Table 4. Based on Table 4, the mean BL of female Etawah crossbred goats was 50.07±3.88 cm at PI0 (age 3-6 months), 52.83±4.28 cm at PI2 (age 6-8 months), 57.67±4.53 cm at PI4 (age 8-12 months), 59.86±5.44 cm at PI6, and 62.05±4.35 cm at PI8. The mean BL of male Etawah crossbred goats was 51.13±4.55 cm at PI0 (age 8-12 months), 53.97±4.07 cm at PI2 (age 8-12 months), 59.29±5.35 cm at PI4 (age 8-12 months), 61.89±7.12 cm at PI6, and 64.25±10.87 cm at PI8. The body length of female and male Etawah crossbred goats increased with age, consistent with the findings of (Amam, Surjowardojo, & Susilorni, 2022). Male goats had a longer body length than females, with a difference of 1-12 cm. (Purbowati & Agung, 2018) reported that the BL of adult female and male Etawah crossbred goats was 65-70 cm and 70-75 cm, respectively, the BL of adult female and male Senduro goats was 69-77 cm and 71-81 cm, respectively, and the BL of adult female and male goats was 65.70±4.67 cm to 70.89±4.33 cm.

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male Kacang goats was 55-60 cm and 60-65 cm, respectively. The body length of Etawah crossbred goats was relatively similar to that of Etawah crossbred goats, shorter than that of Senduro goats, but longer than that of Kacang goats.

Table 4. Body Length (BL) of Pote Goats in Bangkalan Regency

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number</th>
<th>Height (cm)</th>
<th>6-12 months</th>
<th>12-18 months</th>
<th>18-24 months</th>
<th>24-30 months</th>
<th>30 months+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>1</td>
<td>54.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>51.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
</tr>
</tbody>
</table>

Source: primary data (2023)

Chest Girth (CG) of Pote Goats

The results of the chest girth measurement are presented in Table 5. According to Table 5, the mean chest girth of female Pote goats for PI0 (age 3-6 months: 55.02±4.77 cm, age 6-8 months: 58.14±3.87 cm, and age 8-12 months: 64.47±5.01 cm); PI2: 67.97±6.22 cm; PI4: 71.1±5.19 cm; PI6: 72.17±5.00 cm and PI8: 77.57±6.38 cm. The mean chest girth of male goats for PI0 (age 3-6 months: 55.57±3.84 cm, age 6-8 months: 59.76±5.41 cm, and age 8-12 months: 67.19±6.39 cm); PI2: 72.22±8.83 cm; PI4: 79.00±9.80 cm; and PI6: 82.5±10.61 cm.

The chest girth of both female and male goats increased with age. The chest girth of male goats was larger than that of female goats with a difference of 1-10 cm. The increase in chest girth indicates growth in the rib bone and muscle in the rib bone (Victori, Purbowati, & Lestari, 2016). According to (Suryanto, Suyadi, & Prasetyo, 2018) report, the chest circumference of Etawah Crossbred goats ranges between 54-58 cm (female) and 60-64 cm (male), while Senduro goats measure between 65-70 cm (female) and 75-80 cm (male), and Kacang goats measure 45-50 cm (female) and 50-55 cm (male). Pote goats has a chest circumference similar to that of Senduro goats, but larger than that of Etawah crossbred and Kacang goats.

Scrotal Circumference (SC) of Pote Goats

The results of scrotal circumference (SC) measurements are presented in Table 6. Based on Table 6, the mean SC of male Pote goats in PI0 (age 3-6 months: 17.37±2.67 cm, age 6-8 months: 19.59±2.51 cm, and age 8-12 months: 21.64±3.27 cm); PI2: 22.06±2.65 cm; PI4: 23.50±1.00 cm; and PI6: 24.00±2.83 cm. The mean SC of Pote goats increases with age. (Kurnianto & Setiadi, 2017) reported that the SC of Etawah crossbred goats ranges between 22-25 cm, while for Senduro goats it ranges between 20-25 cm, and for Kacang goats it ranges between 15-20 cm.

Table 5. Chest Girth (CG) of Pote Goats in Bangkalan Regency

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number</th>
<th>SC (cm)</th>
<th>6-12 months</th>
<th>12-18 months</th>
<th>18-24 months</th>
<th>24-30 months</th>
<th>30 months+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>1</td>
<td>55.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>52.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
<td>5.00±0.00</td>
</tr>
</tbody>
</table>

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Therefore, if the SC of adult Pote goats in our study falls between 22.06±2.65 cm and 24.00±2.83 cm, it can be concluded that the SC of Pote goats is similar to that of Etawah crossbred and Senduro goats, but larger than that of Kacang goats. The size of SC can be used as an indicator of reproductive health and semen quality (Fahmy, Ashour, & Mahdy, 2013; Kurnianto & Setiadi, 2017). A larger SC indicates a higher concentration of spermatozoa (Hendri, Ridiy, & Daud, 2017). However, SC size does not affect semen characteristics and testosterone levels (Syamyono, Samsudewa, & Setiati, 2014).

**Mane Ruff Length (MRL) of Pote Goats**

The results of MRL measurements are presented in Table 7. Based on Table 7, the average female goat MRL for PI0 (age 3-6 months: 5.83±2.13 cm, age 6-8 months: 6.33±2.17 cm, and age 8-12 months: 8.21±3.00 cm); PI2: 7.87±3.71 cm; PI4: 7.82±3.89 cm; PI6: 7.69±3.85 cm, and PI8: 7.72±4.42 cm. The average male goat MRL for PI0 (age 3-6 months: 5.80±2.00 cm, age 6-8 months: 6.35±1.88 cm, and age 8-12 months: 7.99±3.19 cm); PI2: 9.94±4.77 cm; PI4: 11.63±6.21 cm, and PI6: 8.5±2.12 cm. The average MRL in female and male Pote goats increased with age.

However, after reaching adulthood, the average MRL for females tended to stagnate, and even decrease. The average MRL in males increased from age 3-6 months to age >1.5-2.5 years (PI4), but decreased in PI6. The decrease in MRL in adult female and male Pote goats is thought to be due to the intentional shearing of the goat's fur by farmers. According to interviews with farmers, shearing is primarily done to make the livestock appear cleaner. Shearing or clipping the goat's fur by farmers. According to the.
which is a cultural practice in the Bangkalan community.

Based on observations, Pote goats breed with long MRL are almost always characterized by a large body weight and chest girth, as well as a convex facial profile (resembling traits of Etawah crossbred or Senduro Goats). Meanwhile, Pote goats with short hair are typically marked by small body size and a straight facial profile (similar to Kacang Goats) (Rasminati, 2013) and (Sugiyanto, Muslihudin, & Satria, 2018) state that MRL is useful for determining grade and selecting breeding stock.

Table 7. Mane Ruff Length (MRL) of Pote Goats in Bangkalan Regency

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number</th>
<th>Regencies</th>
<th>Livestock Age</th>
<th>PI0</th>
<th>PI1</th>
<th>PI2</th>
<th>PI3</th>
<th>PI4</th>
<th>PI5</th>
<th>PI6</th>
<th>PI8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>MRL Mean</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Female</td>
<td>41</td>
<td>58±1.13</td>
<td>29±6.7±2.17</td>
<td>70</td>
<td>8.2±3.6</td>
<td>65</td>
<td>7.8±3.7</td>
<td>61</td>
<td>7.8±2.6</td>
<td>64</td>
<td>7.8±3.8</td>
</tr>
<tr>
<td>Male</td>
<td>47</td>
<td>58±2.01</td>
<td>33±6.7±1.88</td>
<td>75</td>
<td>7.9±4.8</td>
<td>19</td>
<td>9.9±4.8</td>
<td>19</td>
<td>9.9±4.8</td>
<td>19</td>
<td>9.9±4.8</td>
</tr>
</tbody>
</table>

Source: primary data (2023)

Horn Length (HL) of Pote Goats

The results of horn length measurement (HL) are presented in Table 8. Based on Table 8, the average HL of female goats in PI0 (age 3-6 months: 2.89±1.33 cm, age 6-8 months: 3.76±1.36 cm, and age 8-12 months: 5.36±1.73 cm); PI2: 6.58±2.00 cm; PI4: 8.48±2.35 cm; PI6: 9.08±3.08 cm, and PI8: 10.16±3.52 cm. The length of horns of male goats in PI0 (age 3-6 months: 4.02±4.58 cm, age 6-8 months: 5.26±3.20 cm, and age 8-12 months: 7.69±3.25 cm); PI2: 8.28±3.85 cm; PI4: 11.13±6.28 cm, and PI6: 12.00±5.66 cm. Horn length in female and male Pote goats increases with age. The average horn length in male goats is higher than in females, with a difference of 2-3 cm. Dwiyanto and Susilowati (2015) reported that HL in Etawah crossbred goats was 5.5-10.5 cm (female) and 14.6-18.3 cm (male), in Senduro goats was 3-5 cm (female) and 8-11 cm (male), while in Kacang goats was 4-12 cm (female) and 7-19 cm (male). Based on this, Pote goats have horn lengths that are relatively similar to Etawah crossbred and Kacang goats, but longer than Senduro goats. Horns in goats have various uses, such as for self-defense, obtaining food, and as a tool to attract attention during mating processes (Nasrullah, et al, 2021). Horn length in goats influences the selling price of livestock (Siddiq , Rahmatullah, & Ibrahim, 2021).

Ear Length (EL) of Pote Goats

The measurement results of the length of the goats’ ears (EL) are shown in Table 9. Based on Table 9, the average EL of female Etawah crossbred goats were as follows: PI0 (age 3-6 months: 16.34±1.87 cm, age 6-8 months: 17.69±1.54 cm, and age 8-12 months: 18.07±2.31 cm); PI2: 18.40±2.46 cm; PI4: 18.64±2.24 cm; PI6: 18.86±2.13 cm and PI8: 19.41±2.33 cm. The average EL of male goats were as follows: PI0 (age 3-6 months: 16.89±2.29 cm, age 6-8 months: 16.85±3.70 cm, and age 8-12 months: 18.28±2.86 cm); PI2: 18.53±4.32 cm; PI4: 19.25±2.18 cm; and PI6: 20.50±3.54 cm.

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The length of Etawah crossbred goat ears increased with age. The average EL of young males was almost the same as that of young females, but in adults, the average EL of males was relatively larger than that of females, with a difference of 1-2 cm.

Goats of the Etawah crossbred breed have long, drooping, and folding ears (Amam, Surjowardojo, & Susilolini, 2022). Kacang goats, on the other hand, have small, short, and erect ears (Suyasa, Ida, & Siti, 2016). Ear length is not an indicator of livestock body weight, but can be used in breeding selection (Fitriyah et al, 2022). Based on field observations, the ears of Pote goats appeared to droop and widen just like those of Jawarandu goats. This is in line with what Arraushany (2017) and Disnakjatim (2019) have reported. The length of Pote goat ears is shorter compared to those of Etawah crossbred and Senduro goats (Susilolini et al, 2022).

Table 8. Horn Length (HL) of Pote Goats in Bangkalan Regency

| Sex     | Number | Regencies | 0-1 months | 1-2 months | 2-3 months | 3-4 months | 4-5 months | 5-6 months | 6-7 months | 7-8 months | 8-9 months | 9-10 months | 10-11 months | PI4 | PI6 | PI8 |
|---------|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-----|-----|-----|
| Male    | 1      | 2.70±0.97  | 4.50±0.00  | 5.50±0.00  | 6.50±0.00  | 7.50±0.00  | 8.50±0.00  | 9.50±0.00  | 10.50±0.00 | 11.50±0.00 | 12.50±0.00 | 13.50±0.00 | 14.50±0.00  | 15.50±0.00 | 16.50±0.00 | 17.50±0.00 | 18.50±0.00 |
| Female  | 2      | 2.00±0.00  | 3.00±0.00  | 4.00±0.00  | 5.00±0.00  | 6.00±0.00  | 7.00±0.00  | 8.00±0.00  | 9.00±0.00  | 10.00±0.00 | 11.00±0.00 | 12.00±0.00 | 13.00±0.00 | 14.00±0.00  | 15.00±0.00 | 16.00±0.00 | 17.00±0.00 | 18.00±0.00 |

Source: primary data (2023)

Table 9. Ear Length (EL) of Pote Goats in Bangkalan Regency

| Sex     | Number | Regencies | 0-1 months | 1-2 months | 2-3 months | 3-4 months | 4-5 months | 5-6 months | 6-7 months | 7-8 months | 8-9 months | 9-10 months | 10-11 months | PI4 | PI6 | PI8 |
|---------|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-----|-----|-----|
| Male    | 1      | 2.70±0.97  | 4.50±0.00  | 5.50±0.00  | 6.50±0.00  | 7.50±0.00  | 8.50±0.00  | 9.50±0.00  | 10.50±0.00 | 11.50±0.00 | 12.50±0.00 | 13.50±0.00 | 14.50±0.00  | 15.50±0.00 | 16.50±0.00 | 17.50±0.00 | 18.50±0.00 |
| Female  | 2      | 2.00±0.00  | 3.00±0.00  | 4.00±0.00  | 5.00±0.00  | 6.00±0.00  | 7.00±0.00  | 8.00±0.00  | 9.00±0.00  | 10.00±0.00 | 11.00±0.00 | 12.00±0.00 | 13.00±0.00 | 14.00±0.00  | 15.00±0.00 | 16.00±0.00 | 17.00±0.00 | 18.00±0.00 |

Source: primary data (2023)

Ear Width (EW) of Pote Goats

The results of the ear width (EW) measurements are presented in Table 10. Based on Table 10, the mean EW of female goats in PI0 (age 3-6 months: 7.80±0.91 cm, age 6-8 months: 8.34±0.61 cm, and age 8-12 months: 8.49±1.02 cm); PI2: 8.48±0.85 cm; PI4: 8.84±0.88 cm; PI6: 8.68±0.95 cm and PI8: 9.04±0.93 cm. The mean EW of male goats in PI0 (age 3-6 months: 7.72±0.74 cm,

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Table 10. Ear Width (EW) of Pote Goats in Bangkalan Regency

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>Ear Width (cm)</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-3 months</td>
<td>4 months</td>
<td>6 months</td>
</tr>
<tr>
<td>Male</td>
<td>5.78 ± 0.18</td>
<td>5.91 ± 0.19</td>
<td>5.85 ± 0.17</td>
</tr>
<tr>
<td>Female</td>
<td>5.70 ± 0.17</td>
<td>5.93 ± 0.20</td>
<td>5.82 ± 0.18</td>
</tr>
</tbody>
</table>

Table 11. Phenotype Frequency of Qualitative Traits of Pote Goats in Bangkalan Regency

<table>
<thead>
<tr>
<th>Sex</th>
<th>Total</th>
<th>Color</th>
<th>Face Profile</th>
<th>Horn</th>
<th>Beard</th>
<th>Papilla</th>
<th>Mane Ruff</th>
<th>Udder Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>White</td>
<td>Black</td>
<td>Exist</td>
<td>Non-existent</td>
<td>Exist</td>
<td>Non-existent</td>
<td>Exist</td>
</tr>
<tr>
<td>Female</td>
<td>445</td>
<td>378</td>
<td>525</td>
<td>325</td>
<td>120</td>
<td>143</td>
<td>275</td>
<td>25</td>
</tr>
<tr>
<td>(%)</td>
<td>89.3</td>
<td>10.7</td>
<td>91.1</td>
<td>91.7</td>
<td>91.7</td>
<td>91.7</td>
<td>91.7</td>
<td>91.7</td>
</tr>
</tbody>
</table>

Pote Goat Qualitative Traits

The data on the qualitative traits of Pote goats has been tabulated and the frequency of their phenotypes calculated. The results are presented in Table 11. Based on Table 11, the qualitative traits of Pote goats in Bangkalan Regency are as follows: (1) Body color: white (86.01%), mixed color (13.99%); (2) Face profile: convex (71.70%), straight (28.30%); (3) Horn shape: straight outward (left-right) (55.79%), straight backward (38.10%), curved (5.47%), and polled (0.80%); (4) Beard: no beard (77.17%), with beard (22.83%); (5) Papilla: no papilla (99.68%), with papilla (0.32%); (5) Mane ruff : with mane ruff (98.07%), without mane ruff (1.93%); and (6) Udder shape: jug (84.64%), bottle (15.36%).

The body color of both male and female Pote goats is predominantly white, which is the main characteristic of Pote goats, a local Indonesian goat breed from Madura, East Java. This is the reason why

Source: primary data (2023)
farmers in Bangkalan refer to this Madura local goat as the Pote goat. Pote (in Madurese language) means white (in Indonesian).

CONCLUSION

The Pote goat in Bangkalan, East Java, is classified as a small type of local Indonesian goat based on the body weight of adult females and as a large type based on shoulder height. Body weight and body size increase with age. The white color on the body, convex facial profile, drooping and widened ears with relatively short size, straight right and left horns, rewos fur, absence of papillae, and jug-shaped udder are the dominant qualitative characteristics.

ACKNOWLEDGMENTS

The researcher would like to express gratitude to the Pote Goat breeders in Bangkalan Regency as well as all parties who have provided assistance and facilitated the successful implementation of this research.

Figure 2. Differences in Appearance of the Quality Characteristics of Pote Goats Bangkalan Regency
REFERENCES


