



IDENTIFICATION OF WAIST CIRCUMFERENCE, HIP WIDTH, CHEST WIDTH, AND CHEST DEPTH MEASUREMENTS OF FEMALE PRIANGAN SHEEP AT SP3TDK TAMBAK MEKAR SUBANG REGENCY

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ABSTRACT

Priangan Sheep are a local Indonesian sheep breed that has good environmental adaptability and high economic value, measuring these morphometric characteristics is important as a selection effort for breeding Priangan Sheep, especially at SP3TDK Tambak Mekar, which is a breeding unit and development center for Priangan Sheep in West Java. Body measurements that can be measured include waist circumference, waist width, chest width, and chest depth. The purpose of this study was to identify the body size of female Priangan Sheep at SP3TDK. The research method was a census with 50 female Priangan Sheep, 6 months and <1 year, and >1-2 years old, measurements using measuring tapes and caliper sticks. Data were processed using descriptive statistics, which include minimum, maximum, average, standard deviation, and coefficient of variation. The average value of sheep body size is known to increase with age, the body size of Priangan female sheep in SP3TDK at the age of 6 months and <1 year, and >1-2 years respectively, namely waist circumference 59.75 ± 5.35 cm and 68.48 ± 4.54 cm, hip width 13.07 ± 1.29 cm and 14.97 ± 1.29 cm, chest width 14.10 ± 1.11 cm and 15.88 ± 1.22 cm, and chest depth 24.00 ± 1.99 cm and 27.51 ± 1.51 cm.

Keywords : Female Priangan sheep, waist circumference, hip width, chest width, chest depth.

Introduction

Sheep are small ruminants with significant potential for future development. The total sheep population in Indonesia in 2024 was recorded at 9.219.176 with West Java Province contributing the largest population at 6.971.877 (BPS, 2025). Based on this, it can be concluded that West Java has the largest sheep population in Indonesia, making it the province with the greatest potential for sheep development. The types of sheep raised in West Java are also quite diverse, including Priangan Sheep, Thin-Tailed and Fat-Tailed Sheep, Local Sheep, and Garut Sheep. Priangan Sheep were initially developed through undirected crossbreeding between Local Sheep, Merino Sheep, and Kaapstad Sheep during the Dutch colonial period in the 19th century (Heriyadi & Nurmeidiansyah, 2015). Priangan Sheep have also been officially designated as one of Indonesia's native sheep breeds based on Decree of the Minister of Agriculture of the Republic of Indonesia Number 300/Kpts/SR.120/5/2017, which stipulates that Priangan Sheep are a local breed native to Indonesia

with various advantages, including high economic value and excellent environmental adaptability.

One important aspect of sheep husbandry and management is knowledge and understanding of genetic inheritance. One stage of genetic inheritance is the selection of superior ewes. Selection can be conducted in various ways, including morphometric measurements of the sheep's body, or by determining quantitative characteristics through body measurements. Some sheep body measurements that can be measured include waist circumference, waist width, chest width, and chest depth. Wider waist and hip measurements, accompanied by a larger abdominal and uterine cavity, can provide more space for the development of a greater number of offspring during pregnancy (Prasita et al., 2015). Waist width is a body measurement that can be an important indicator or reflection of sheep because most of the sheep's muscles are attached to the upper thigh bone. Therefore, waist width reflects the meatiness of the sheep's rear, especially the loin (Syuhada et al., 2015). Chest width reflects the growth of the sheep's shoulder

bones and chest cavity, the development of internal organs, and the attachment of meat to the shoulder bones. As chest width increases, body weight also increases due to a positive correlation. Chest size itself is important to determine rib growth and the amount of meat attached to the bones. The more meat attached to the bones, the better the growth and the larger the sheep's body size (Pratama et al., 2016).

The Tambak Mekar Sheep and Goat Livestock Development Service Unit (SP3TDK) of Subang Regency is a breeding unit in West Java, a branch of the Margawati Technical Implementation Unit (UPTD Margawati). This unit aims to develop sheep breeds other than Garut Sheep, as the development of Garut Sheep is focused in Margawati, Garut. Priangan Sheep are one of the sheep breeds which is developed and becomes the focus of SP3TDK Tambak Mekar. The existence of SP3TDK Tambak Mekar is a development unit for the Priangan Sheep breed in West Java which shows the government's seriousness in preserving the Priangan Sheep breed which is a local genetic wealth. Considering the importance of these factors and the role of SP3TDK Tambak Mekar as a Priangan Sheep breeding unit, the author is interested in identifying morphometrics including waist circumference, hip width, chest width, and chest depth in female Priangan Sheep at SP3TDK Tambak Mekar.

Materials and Methods

The research objects identified and measured in this study were a total of 50 sheep, divided into 23 female Priangan Sheep aged 6 months - ≤ 1 year and 27 female Priangan Sheep aged >1 - 2 years at SP3TDK Tambak Mekar, Subang Regency. The sheep's body parts or body measurements observed included waist circumference, waist width, chest width, and chest depth. The equipment used in the study was a measuring tape and calipers with units of cm with an accuracy level of 0.1 cm for each tool. Data collection itself was carried out using a census method on the entire population of female Priangan Sheep in a predetermined age range and measurements were carried out directly in the field. The data obtained from these measurements were processed using a quantitative descriptive method that includes the average, minimum value, maximum value, standard deviation, and coefficient of variation (Febriani, 2022).

The variables observed in this study were waist circumference, waist width, chest width, and chest depth. Primary data were obtained through direct field measurements conducted as follows (Syuhada et al., 2015, citing Heriyadi, 2012).

1. Waist Circumference

Waist circumference was measured by wrapping a measuring tape around the hip region of the sheep, precisely at the most prominent part of the hips.

2. Waist Width

Waist width is the distance between the left and right protrusions of the hip bones (tuber coxae). A measuring stick was used as the measuring instrument.

3. Chest Width

Chest width was measured as the distance between the left and right scapula bones (os scapula). A measuring stick was used as the measuring instrument.

4. Chest Depth

Chest depth was measured from the highest point of the shoulder to the deepest point of the breastbone (sternum), using a measuring stick.

Results and Discussion

General Conditions of SP3TSK Tambak Mekar, Subang Regency

SP3TDK (Sheep and Goat Livestock Breeding Development Service Unit) is a breeding unit located in Tambak Mekar Village, Jalan Cagak District, Subang Regency. This unit was established in 2010 and stands on 26.5 hectares of land owned by the West Java provincial government and has various facilities built inside, including an office building, employee housing, 17 pens, a feed warehouse divided into green and concentrate warehouses, a prayer room, and land for growing its own grass, mostly planted with elephant grass. SP3TDK itself focuses on the development of non-Garut Sheep, where one of the groups that is the focus of development is the Priangan Sheep. The average temperature at the farm site itself ranges between 28–32°C and humidity ranges from 57–73% (Hutasoit et al., 2022). This research itself was conducted in Pen B1 measuring 41 m x 7.5 m, which is divided into 12 colony pens specifically for Priangan Sheep. Other pregnant or nursing Priangan Sheep are housed in Pens A3, A4,

and A5, which are specifically designated for lactating and pregnant Priangan Sheep.

Priangan Sheep at the SP3TDK are fed manually by staff twice daily, but in this Priangan Sheep pen, feed is sometimes provided to the sheep using a machine that mixes and distributes the feed. The feed used is a combination of elephant grass and odot grass, depending on forage availability. The feed is then supplemented with specially ordered concentrate containing sufficient nutrients, mineral salts to meet the sheep's mineral and salt requirements. The feed composition is determined based on physiological needs and the number of animals in each pen, and is regulated by a team focused on feed provision. The concentrate used at the SP3TDK has the following nutritional content: a maximum moisture content of 14%, a maximum ash content of 13%, a minimum crude protein content of 14%, a calcium content of 0.6–1.5%, a phosphorus content of 0.2–

0.8%, and a minimum TDN content of 60%. The grass used as feed, namely elephant grass and odot grass, each has a nutrient content of 12.77% and 14.35% crude protein, with TDN values of 57.62% and 63.98% (Kamid et al., 2024, citing Qohar & Prasetyo, 2022). Based on these data, it can be concluded that the feed for Priangan Sheep provided at SP3TDK has met the crude protein and TDN requirements of Priangan Sheep both at the age of 5-7 months or young (Hasan et al., 2022), as well as the feed requirements for adult sheep which require 3.5% dry matter of body weight and a crude protein content of 12% (NRC, 2006, as cited in Septian et al., 2020).

Waist Circumference of Female Priangan Sheep at SP3TDK Tambak Mekar

Based on the results of the study conducted at SP3TDK Tambak Mekar, the findings obtained are presented in Table 1.

Table 1. Waist Circumference of Female Priangan Sheep at SP3TDK Tambak Mekar

No	Measurement	Age 6 months – ≤ 1 year	Age > 1-2 years
1	Mean (cm)	59.75	68.48
2	Minimum (cm)	51.37	59.60
3	Maximum (cm)	74.50	76.23
4	Standard Deviation (cm)	5.47	4.54
5	Coefficient of Variation (%)	9.16	6.63

Based on the results of the identification of the body sizes of female Priangan Sheep at SP3TDK, the average waist circumference of Priangan Sheep increased with the age of the sheep, reaching 59.75 ± 5.47 cm at the age of 6 months – ≤ 1 year and 68.48 ± 4.54 cm at the age of >1–2 years, growth that is in accordance with the normal growth curve. The body size of sheep at the age of 6 months – ≤ 1 year obtained from the identification results was found to be relatively the same as previous research by Dewi (2022) on female Priangan Sheep in Cipunagara Subang District which was known to have a waist circumference of 59.58 ± 7.20 cm, but the results obtained in Table 1 also show that the results of the waist circumference of sheep are smaller in sheep in the age group >1–2 years when compared to Rusman's research (2013) on female Priangan Sheep in West Java at the age of 1–2 years which had a size of 75.92 ± 5.88 cm, this can be caused by genetic differences in sheep that have different parents at the

research location because West Java is a large province and of course the sheep in West Java are also very diverse therefore these results are still considered normal if considered from the scale of the research location.

The waist circumference measurements obtained in Table 1 also show that the minimum and maximum values of the sheep's waist circumference increase with growth and age. This comparison compares the minimum and maximum values with the minimum and maximum values of the waist circumference of Local Sheep in Majalengka (Yuliandri & Imanudin, 2020) which ranged from 67 cm to 75 cm. This indicates that the variation in body size of sheep at SP3TDK Tambak Mekar is more diverse in each age group. The coefficient of variation obtained in Table 1 shows a decrease from 9.16% to 6.63%, indicating that sheep growth becomes more uniform and more homogeneous with increasing age, this is consistent with the opinion of Christi et al.

(2025) who stated that a coefficient of variation of less than 10% indicates the uniformity of the livestock being measured, as well as Haile's opinion

(2009) who stated that a decrease in the coefficient of variation of sheep body size with age reflects growth homogenization.

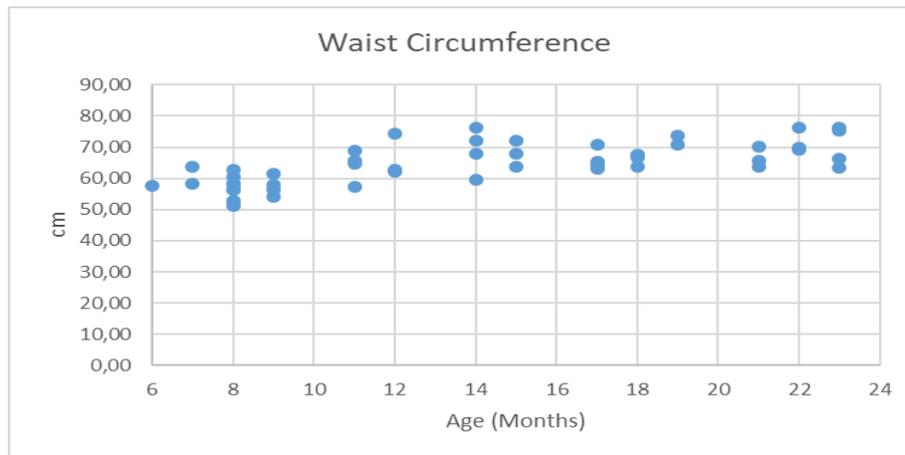


Figure 1. Waist Circumference Scatter Chart Data

Scatterplot chart shows a positive relationship between sheep age and waist circumference. As illustrated, body size increases with age. The data points are well distributed and there is no outliers, a data point whose value is very different (extreme) from most of the other data in a data set.

Hip Width of Female Priangan Sheep at SP3TDK Tambak Mekar

Based on the results of the study conducted at SP3TDK Tambak Mekar, the findings obtained are presented in Table 2.

Table 2. Hip Width of Female Priangan Sheep at SP3TDK Tambak Mekar

No	Measurement	Age 6 months – ≤ 1 year	Age > 1-2 years
1	Mean (cm)	13.07	14.97
2	Minimum (cm)	10.63	12.20
3	Maximum (cm)	15.27	17.60
4	Standard Deviation (cm)	1.29	1.29
5	Coefficient of Variation (%)	9.84	8.63

Based on the results of the identification of the body sizes of female Priangan Sheep in SP3TDK, the following is obtained in Table 2, which is the average size of the pelvic width of Priangan Sheep which was found to also increase with age according to the normal growth curve, where the results obtained are that the waist width of female Priangan Sheep in SP3TDK has a size of 13.07 ± 1.29 cm at the age of 6 months–≤1 year and has a size of 14.97 ± 1.29 cm at the age of > 1–2 years. The results of these measurements show that the pelvic width of sheep in SP3TDK aged 6 months–≤1 year when compared has a larger size compared to the measurement results of Hutasoit et al. (2022) at the same location where sheep were known to have a waist width of (11.00 ± 0.84 cm), and the data in Table 2 also shows that

sheep aged >1–2 years have a larger waist width when compared to the results of Dewi (2022) in Cipunagara Subang on female Priangan Sheep aged >24 months which had a size of 14.47 ± 1.42 cm. The difference in body size in the sheep age group of 6 months–≤1 year is caused by differences in sheep generations and a better selection program applied, resulting in a larger sheep body size which means the selection program carried out at SP3TDK is running well. Meanwhile, the difference in body size in the adult female Priangan Sheep age group is caused by differences in research locations which of course the genetics of the sheep are also different because the parents are also different.

The minimum and maximum values of the waist width of sheep obtained in Table 2 found that

the results increased with the age of the sheep, it can be seen that the waist width size from 10.63 cm increased to 12.20 cm for the minimum value from 15.27 cm increased to 17.60 cm for the maximum value. Compared with Local Sheep in Majalengka (Yuliandri & Imanudin, 2020) which have a waist width of 17.58–19.55 cm, it can be seen that Priangan Sheep in SP3TDK have a smaller body size and a narrower range of minimum and maximum values

which shows diversity in waist width size that is not too diverse and the waist width size of Priangan Sheep is smaller than Local Sheep. Coefficient of variation in Table 2 can also be seen in the results which decreased from 9.84% in the young age group of sheep to 8.63% when the sheep became adults, which shows that body size becomes more uniform and homogeneous as the sheep age.

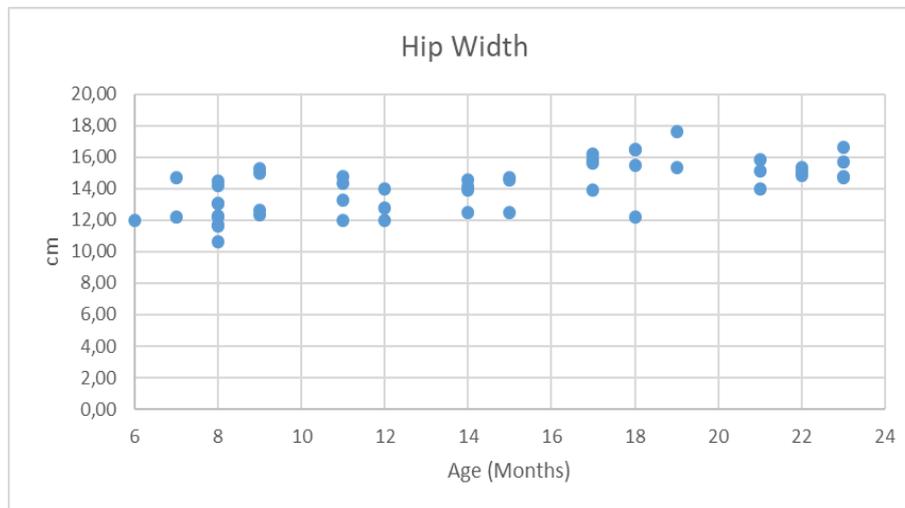


Figure 2. Hip Width Scatter Chart Data

Scatterplot shows a positive relationship between sheep age and hip width. As illustrated, body size increases with age. The data points are well distributed and there is no outliers, a data point whose value is very different (extreme) from most of the other data in a data set.

Chest Width of Female Priangan Sheep at SP3TDK Tambak Mekar

Based on the results of the study conducted at SP3TDK Tambak Mekar, the findings obtained are presented in Table 3.

Table 3. Chest Width of Female Priangan Sheep at SP3TDK Tambak Mekar

No	Measurement	Age 6 months – ≤ 1 year	Age > 1-2 years
1	Mean (cm)	14.10	15.88
2	Minimum (cm)	12.30	13.83
3	Maximum (cm)	16.53	17.53
4	Standard Deviation (cm)	1.11	1.22
5	Coefficient of Variation (%)	7.91	7.70

The results of the chest width identification obtained in Table 3 show that the average chest width of Priangan female sheep is also known to increase with age, just like other body sizes, with the average size obtained being 14.10 ± 1.11 cm in sheep aged 6 months–≤1 year and 15.88 ± 1.22 cm in the identification of waist width of sheep aged > 1–2 years at SP3TDK. This increase in body size in the chest width

section can reflect the development of the shoulder bones, chest cavity, and internal organs, where this chest width is related to the increase in body weight of sheep. Measurement of chest width in these two age groups based on the results obtained in Table 3 shows greater results when compared to the measurement of chest width of Priangan female sheep by Hutasoit et al. (2022) at the same location, where

Priangan Sheep were found to have an average chest width of 11.00 ± 0.88 cm at 6–12 months of age and an average of 13.34 ± 1.25 cm at 1–2 years of age.

This difference is due to the different generations of sheep used for chest width identification and the annual selection program at the SP3TDK, which has shown good results based on body size measurements at the SP3TDK, resulting in sheep with larger body sizes. The minimum and maximum chest width values in Table 3 above are known to increase with age, from 12.30 cm to 13.83 cm in young sheep (aged 6 months– ≤ 1 year), and from 16.53 cm to 17.53 cm for both the minimum and maximum values in Priangan ewe sheep aged $>1-2$ years. Compared with the results of other studies on other sheep groups,

namely the local Majalengka sheep group by (Yuliandri & Imanudin, 2020), it is known that the results obtained that Local Sheep have a chest width of 16.95–20.12 cm, based on these results when compared, it can be concluded that Priangan Sheep in SP3TDK have a smaller chest width, this shows that the chest width of Priangan Sheep is smaller when compared to Local Sheep, especially in both research locations. The coefficient of variation obtained in Table 3 is known to show relatively stable results, namely 7.91% at the age of 6 months– ≤ 1 year and 7.70% at the age of $> 1-2$ years, where these results show a relatively uniform and homogeneous body size as the sheep age increases, these results are the same as the body size of other sheep in this study.

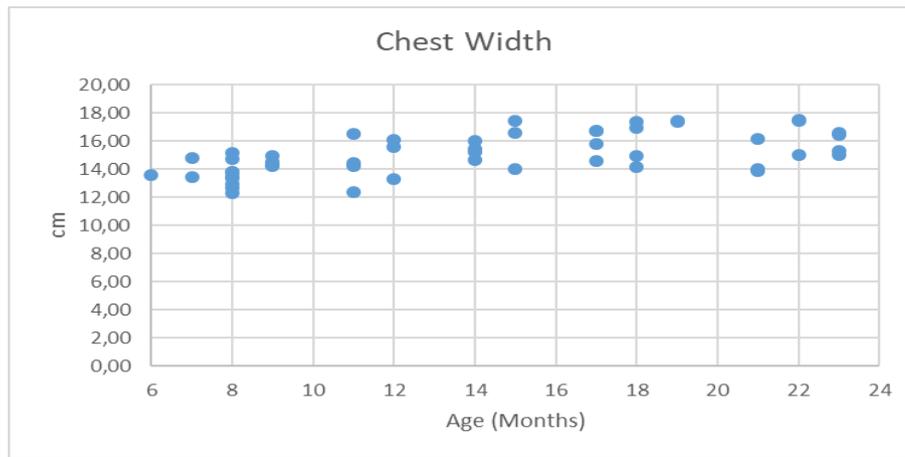


Figure 3. Chest Width Scatter Chart Data

Scatterplot chart shows a positive relationship between sheep age and chest width. As illustrated, body size increases with age. The data points are well distributed and there is no outliers, a data point whose value is very different (extreme) from most of the other data in a data set.

Chest Depth of Female Priangan Sheep at SP3TDK Tambak Mekar

Based on the results of the study conducted at SP3TDK Tambak Mekar, the findings obtained are presented in Table 4.

Table 4. Chest Depth of Female Priangan Sheep at SP3TDK Tambak Mekar

No	Measurement	Age 6 months – ≤ 1 year	Age $> 1-2$ years
1	Mean (cm)	24.00	27.51
2	Minimum (cm)	19.97	24.60
3	Maximum (cm)	27.43	29.97
4	Standard Deviation (cm)	1.99	1.51
5	Coefficient of Variation (%)	8.28	5.47

Table 4 shows the results of the identification of the chest depth of female Priangan Sheep at SP3TDK, where it is known that the average chest depth of female Priangan Sheep at SP3TDK is $24.00 \pm$

1.99 cm in sheep aged 6 months– ≤ 1 year and has a size of 27.51 ± 1.51 cm in sheep aged $>1-2$ years. The increase in body size in the chest is known to reflect the growth of the ribs and body cavity, which has an

effect on accommodating internal organs and supporting the overall growth of sheep. The results obtained in Table 4 show that the chest circumference of sheep age group >1–2 years, when compared with previous research, have a chest circumference size that is in accordance with previous research by Rusman (2013) on Priangan female sheep in West Java which are known to have a size (27.50 ± 2.34 cm) and the results in Table 4 also show a larger chest circumference size when compared with other sheep groups, namely Thin-Tailed Sheep which are known to have a chest depth of 23.20 ± 1.71 cm (Suryani et al., 2023).

The chest depth in Table 4 above can be seen to have minimum and maximum values of chest depth that increase with the age of the sheep, just like other body sizes, where the chest depth is 19.97 cm to

24.60 cm at the age of 6 months–≤1 year and has a minimum value of 27.43 cm to 29.97 cm for the maximum value at the age of > 1–2 years. These results when compared with other sheep groups, one of which is the Local Sheep group which was researched by Yuliandri & Imanudin, (2020) in Majalengka which is known to have a chest depth of 20.18–25.70 cm, the minimum and maximum values of the chest depth of the Priangan Sheep are significantly larger when compared with the results of the chest depth measurements of the Local Sheep. The coefficient of variation obtained in Table 4 can also be seen to have decreased from 8.28% to 5.47%, just like other body sizes, which shows that body size growth becomes more uniform or homogeneous with increasing age of the sheep.

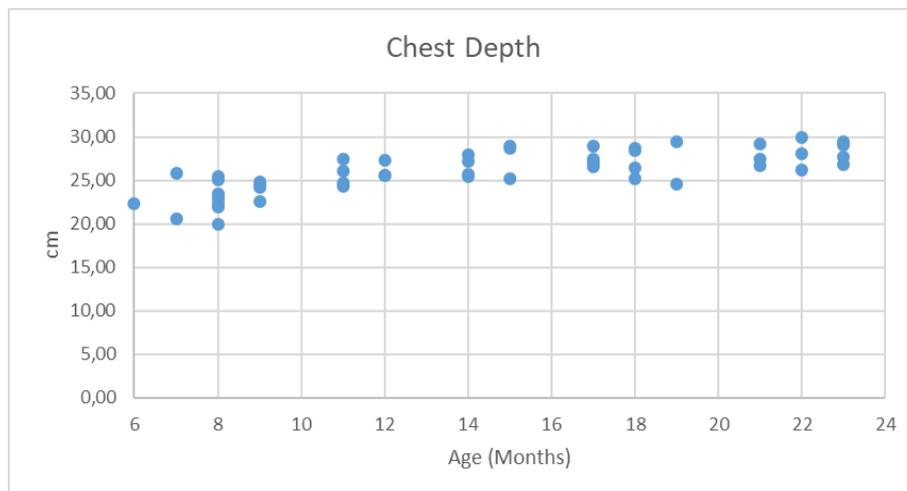


Figure 4. Chest Depth Scatter Chart Data

Scatterplot chart shows a positive relationship between sheep age and chest depth. As illustrated, body size increases with age. The data points are well distributed and there is no outliers, a data point whose value is very different (extreme) from most of the other data in a data set.

Conclusion

Based on the results of the study and discussion, it can be concluded that the morphometric measurements of female Priangan Sheep at SP3TDK Tambak Mekar are as follows:

1. Waist circumference of female Priangan Sheep at the age of 6 months - <1 year is 59.75 ± 5.35 and at the age of >1–2 years is 68.48 ± 4.54 cm.

2. Hip width of female Priangan Sheep at the age of 6 months - <1 year is 13.07 ± 1.29 cm and at the age of >1–2 years is 14.97 ± 1.29 cm.
3. Chest width of female Priangan Sheep at the age of 6 months - <1 year is 14.10 ± 1.11 cm and at the age of >1–2 years is 15.88 ± 1.22 cm.
4. Chest depth of female Priangan Sheep at the age of 6 months - <1 year is 24.00 ± 1.99 cm and at the age of >1–2 years is 27.51 ± 1.51 cm for >1–2 years.

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