

Reproductive outcomes of Ongole crossbred cows in the Mapanget District of Manado, North Sulawesi Province

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ABSTRAK

Sektor peternakan adalah penyumbang penting pada peningkatan perekonomian Indonesia karena sebagai sumber penghasilan bagi jutaan peternak di seluruh negeri. Walaupun demikian, di berbagai wilayah di Indonesia, termasuk di Kecamatan Mapanget Kota Manado Provinsi Sulawesi Utara, karena praktik peternakan tradisional masih dominan, terdapat keterbatasan untuk peningkatan produksi ternak. Upaya peningkatan produksi dapat dilakukan melalui pengamatan intensif tentang penampilan reproduksi sapi betina yang dipelihara secara lokal tradisional. Penelitian ini akan memfokuskan pada penampilan reproduksi sapi betina jenis Ongole di daerah Kecamatan Mapanget. Metode penelitian yang digunakan adalah dengan cara survei, yang menggunakan data primer dan sekunder. Data primer diperoleh secara langsung melalui wawancara kepada peternak (responden) dengan menggunakan kuesioner. Data sekunder diperoleh dari informasi berbagai instansi terkait seperti Dinas Peternakan, Kecamatan, Kantor Statistik dan lain lain. Berdasarkan hasil pembahasan dapat diambil kesimpulan bahwa kinerja penampilan reproduksi sapi betina Peranakan Ongole di Kelurahan Bengkol, Buha, Mapanget Barat Kecamatan Mapanget Kota Manado Provinsi Sulawesi Utara sudah baik dilihat dari aspek variabel umur pubertas dengan angka capaian kisaran 21 – 24,8 bulan, service per conception pada kisaran 2 kali, *calving interval* sekitar 11,5 – 13,4 bulan, serta umur pertama kali beranak dengan angka capaian berkisar 30 - 33,6 bulan.

Katakunci: : industri peternakan, sapi betina PO, penampilan reproduksi, Mapanget

ABSTRACT

The livestock sector is actually an important contributor to the improvement of the Indonesian economy because it is a source of income for millions of farmers throughout the country. However, in various regions in Indonesia, including in Mapanget District, Manado City, North Sulawesi Province, because traditional livestock practices are still dominant, there are limitations to increase livestock production. Efforts to increase production can be made through intensive observation of the reproductive appearance of traditional locally raised heifers. This study aims to evaluate the reproductive performance of Ongole-crossbreed cow in the Mapanget District. The research methodology employed a survey approach, collecting both primary and secondary data. Primary data were obtained directly through interviews with farmers (respondents) using structured questionnaires, while secondary data were sourced from various relevant institutions, including the Animal Husbandry Office, the Sub-District Office, and the Statistics Office. The findings indicate that the reproductive performance of Ongole crossbreed cows in the villages of Bengkol, Buha, and West Mapanget, within the Mapanget District, is favorable. Key reproductive metrics include an average age at puberty of 21 to 24.8 months, a service per conception rate of approximately two, a calving interval of 11.5 to 13.4 months, and an age at first calving ranging from 30 to 33.6 months.

Keywords: Livestock industry, Ongole crossbreed cows, reproductive performance, Mapanget.

INTRODUCTION

The livestock industry is a crucial sector supporting Indonesia's economy, providing a source of income for millions of farmers nationwide, including those in the Mapanget District, Manado City, North Sulawesi Province. One type of livestock raised in this area is the Ongole crossbreed cow.

The reproduction of female cows is a key factor in the overall productivity and sustainability of cattle farming (Meikle *et al.*, 2018; Tade and Melesse, 2024; D'Occhio *et al.*, 2019). However, in the context of livestock farming in the Mapanget District, there are still limitations in understanding the factors that affect the reproductive performance of female cows and the effectiveness of reproductive management. In addition, traditional animal husbandry practices in the North Sulawesi area are heavily influenced by local wisdom and customs, but their impact on the reproductive performance of female cows is not fully understood.

In addition, many assessments highlight the importance of environmental factors, such as the availability of natural feed and climate, on the reproductive performance of female cows in traditional livestock systems. These factors are often the subject of research due to various considerations such as those carried out by Fanzo *et al.* (2021); Godde *et al.* (2021) and Mamphogoro *et al.* (2024). However, this study only addresses a few aspects and does not provide a comprehensive overview of the factors affecting the reproduction of traditional female cows in the Mapanget District, Manado City, North Sulawesi Province. The factors observed in this study are reproductive aspects which include the variables of puberty age, service per conception, *calving interval*, and the age of first calving. By gaining a better understanding of these factors, it is hoped

that more effective strategies can be formulated to improve the reproductive efficiency and productivity of female cows. This, in turn, could make a positive contribution to the development of livestock farming and the welfare of farmers in the Mapanget District, Manado City, North Sulawesi Province. Therefore, this study will focus on the reproductive performance of Ongole crossbreed cows in the Mapanget District area.

MATERIAL AND METHODS

The sample of farmers was selected purposively from various villages within the Mapanget District. Primary data were collected through direct interviews with these selected farmers. Secondary data were obtained from supporting sources, including information provided by the Livestock Office, District Office, Statistics Office, and other relevant agencies.

The observed parameters included: age at puberty, *service per conception* (S/C), *calving interval* (CI), and age at first calving (AFC). Age at puberty is defined as the age at which reproductive organs of domestic animals begin to function and reproduction is possible (Fantuz *et al.*, 2024). *Service per conception* (S/C), representing the success rate of insemination in achieving pregnancy, was calculated as the number of services required for a successful conception according to Alem (2021). *Calving Interval* (CI) was computed using the date of the previous calving and the current calving date (Shin *et al.*, 2021). Age at first calving (AFC) is a period when a cow reaches its maturity and reproduces for the first time. AFC was determined by the birth date of the heifer and the date of its first calving (Shin *et al.*, 2021). Data analysis was carried out in a quantitative descriptive methods based on the average value and standard deviation

RESULTS AND DISCUSSION

Characteristics responden

The characteristics of the respondents were measured to describe and provide an overview of the identity of the respondents in this study which included the age of the farmers, the level of education, and the experience of raising livestock. The results can be seen as follows:

Farmer age

The age of the breeder is one of the factors that may affect a person's work productivity. A person's age will affect their ability to do work. Kifli *et al.* (2021) stated that farmers in the productive age group are the main capital in the development of a livestock business. The age of the farmers who were used as respondents in this study can be seen in Table 1. From the observation data (Table 1), it was shown that 25% of the respondents were 31-40 years old, 8.33% of the respondents were 41-50 years old, 58.33% were 51-60 years old, and 8.33% were 61-70 years old. When associated with productive age, most farmers, 91.66%, are in the productive age range (30-64 years).

This classification of productive age is in accordance with the Inonesia's Labor Law No. 13 of 2003 which stipulates that the productive age population is between the ages of 15 – 64 years. According to Dziechciaż and Filip (2014); Preston and

Biddell (2021), age is one of the characteristics of individuals that affect a person's biological and physiological functions, and these two factors can contribute to the success of a business that he or she runs. According to Rizzo *et al.* (2024), the younger the farmer's age (productive age), the higher the interest in adopting the technology needed to support the success of his business. Age will affect a person in learning, understanding and accepting renewal and increasing work productivity (Brown *et al.*, 2019; Joanna and Biddell, 2021).

Education

A person's education can affect efforts to run a business, including a cattle breeding business, because adequate education can help farmers in the development of cattle in the future (Mthi *et al.*, 2020). The level of education of the respondents in this study can be seen in Table (2). From the observation data, it can be seen that 16.7, 66.7, and 8.3% of farmers have elementary, junior high, and high school education, respectively (Figure 1). This shows that most of the farmers are relatively well educated, namely at the high school and undergraduate levels. In general, this value affects the productivity of the farmer's business because it is considered more rational in carrying out a business (Mthi *et al.*, 2020).

Tabel 1. Percentage of Respondents' Farmer Age

Age (year)	Number of Respondents (people)	Percentage (%)
31-40	3	25
41-50	1	8,33
51-60	7	58,33
61-70	1	8,33
Total	12	100

Table 2. Education Level

Village	Education Level			
	Elementary	Junior High School	Senior High School	Bachelor
Bengkol	-	3	-	-
Buha	2	2	-	-
Mapanget Barat	-	3	1	1
Total	2	8	1	1

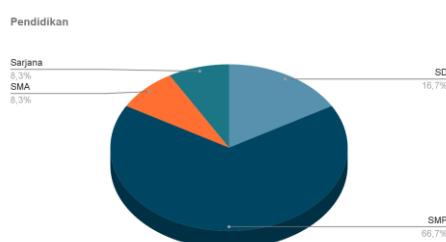


Figure 1. Percentage of Respondents' Education Level

Experience of raising livestock

Breeding experience, for farmers, can determine the continuity and success of the livestock business. Experience in running a business will make it easier for farmers to overcome problems and make decisions (Hastuti *et al.*, 2016). The results of observations about the length of breeding in Wori District are presented in Table 3. From the data (Table 3) it shows that 2 farmers with 5 years of experience, namely in Bengkol Village. Meanwhile, 10 years of

livestock farming experience was found in 1, 1, and 2 farmers in Bengkol, Buha, and West Mapanget Villages, respectively. Only 2 farmers with 15 years of experience are in West Mapanget Village. Each of 2 and 1 farmers with 20 years of experience, namely in Buha and West Mapanget Villages, respectively. Data also shows that there is one farmer who has 40 years of breeding experience, namely in Buha Village.

Table 3. Experience of Raising livestock

Village	Experience in Year				
	5	10	15	20	40
Bengkol	2	1	-	-	-
Buha	-	1	-	2	1
Mapanget Barat	-	2	2	1	-
Total	2	4	2	3	1

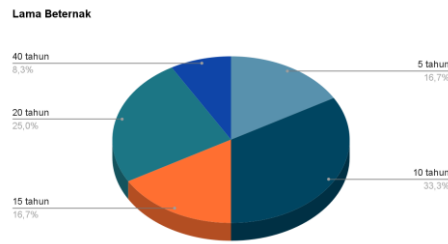


Figure 2. Percentage of Respondents' Experience Level

From the data shown by Figure 2, it is obtained that the farmers have quite long breeding experience, namely 33.3, 16.7, and 25% for 10, 15, and 15 years respectively, and there are even 8.3% who have 40 years of experience. This shows that the majority of livestock farming experience in Mapanget District has been quite long, so it has an impact on better skills in managing cattle farming businesses. Magne *et al.* (2012) and Sekaran *et al.* (2021) had confirmed that experience in livestock farming enhances skills in managing cattle farming operations.

Reproductive Performance

Puberty

The observation results (Table 4) show that the average puberty achievement of Ongole crossbreed cows in Bengkol, Buha and West Mapanget Villages are $21 \pm$

3.21 months, 21.41 ± 3.46 months, and 24.8 ± 4.95 months, respectively. The achievement rate in this study is relatively higher than the results of the research of Nurcholis and Salamony (2019) which reported that the achievement of puberty for 12 Ongole crossbreed cows in Merauke was 20.99 ± 0.099 months.

Service Per Conception (S/C)

Table 5 shows that the average service per conception of Ongole crossbreed in Bengkol Village, Buha, West Mapanget are 2 ± 0 times; 2 ± 0 times and 2.7 ± 4.95 times, respectively. The results confirm that the service achievement rate per conception (2 times) of Ongole crossbreed cows in Bengkol and Buha Villages is lower than the service achievement rate per conception of Ongole crossbreed in West Mapanget Village (2.7 times).

Table 4. Puberty age of Ongole crossbreed cows (month)

Villages	N	Mean	Sd	SE Mean
Bengkol	8	21	3.21	1.135
Buha	44	21.41	3.46	0.520
Mapanget Barat	10	24.8	4.95	1.570

Table 5. Service Per Conception of Ongole crossbreed cows (times)

Villages	N	Mean	Sd	SE Mean
Bengkol	8	2	0	0
Buha	44	2	0	0
Mapanget Barat	10	2,7	4.95	1.57

Overall, the service achievement per conception in this study is much higher than the previous study, Napitupulu (2023) in North Minahasa Regency, which was 1.20 times. Services per conception as a fertility indicator for dairy cows and heifers has an optimal value typically ranges from 1.6 to 1.8 (Siatka *et al.*, 2017).

Calving Interval (CI)

The data in Table 6 shows that the average calving interval of Ongole crossbreed in Bengkol, Buha, West Mapanget Village are 11.5 ± 0.535 months; 11.70 ± 0.794 months and 13.4 ± 1.984 months, respectively. The achievement rate of calving interval in this study is lower than the results of the research of Nasuha *et al.* (2019) who obtained a figure of 16.94 months (± 480 days). Meanwhile, Yulyanto *et al.* (2014) reported that Ongole crossbreed have calving intervals of about 14 months. The value obtained in this study is included in the normal achievement (Michael *et al.*, 2014; Diskin *et al.*, 2016; Titterington *et al.*, 2017).

The observation data shows that the average calving achievement rate of Ongole crossbreed belonging to farmers in Bengkol Village (11.5 months) and Buha Village (11.7 months) is shorter than in West Mapanget Village (13.4 months). The results of the study show that the distance

from calving to the next calving in Mapanget District is relatively good. This can be caused by the ideal age of puberty, proper marriage, and low service per conception value.

The age of first calving (AFC)

The age of first calving is the age of the cow when it experiences its first calving. The data in Table 7 shows that the average age of first calving (AFC) of Ongole crossbreed in Bengkol Village, Buha, West Mapanget is 30 ± 3.21 months; 30.39 ± 3.55 months and 33.6 ± 5.33 months, respectively.

The AFC achievement rate in this study is different, which is faster, compared to the results of the previous study, namely Baliarti *et al.* (2017) who obtained a AFC figure of 30-36 months. From the comparison between villages (Figure 7), it is shown that the achievement of the lowest average AFC is shown in Bengkol Village (30 months) followed by Buha Village (30.39 months) and West Mapanget Village (33.6 months), which can be interpreted that Ongole crossbreed cows belonging to breeders in Bengkol and Buha Villages are relatively better than the AFC achievement. The AFC achieved can be influenced by the age of puberty, the age of first marriage and the length of pregnancy. Some studies (Day and Nogueira, 2013; Troxel and Gadberry, 2021; Steele, 2020) affirm the economic

Table 6. Calving Interval of Ongole crossbreed cows (month)

Villages	N	Mean	Sd	SE Mean
Bengkol	8	11.5	0.535	0.189
Buha	44	11.70	0.794	0.119
Mapanget Barat	10	13.4	1.983	0.628

Table 7. The age of first calving of Ongole crossbreed cows (year)

Villages	N	Mean	Sd	SE Mean
Bengkol	8	30	3.21	0.135
Buha	44	30,39	3.55	0.535
Mapanget Barat	10	33.6	5.33	1.69

benefits of heifers calving for the first time at two years of age instead of at three.

CONCLUSION

Based on the results of the discussion put forward above, it can be concluded that the reproductive performance of Ongole crossbreed in Bengkol, Buha, West Mapanget Village, Mapanget District, Manado City, North Sulawesi Province is quite good in terms of the variable age of puberty with achievement rates (range 21 – 24.8 months), service per conception (range 2 times), calving interval (range 11.5 – 13.4 months), and the age of first calving with achievement rates (range 30 – 33.6 months).

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