**LEMBAR REKAPITULASI**

**HASIL PENILAIAN 2 (DUAS) SEJAWAT SEBIDANG ATAU 2 (DUAS) PEER REVIEW KARYA ILMIAH: PROSIDING**

<table>
<thead>
<tr>
<th>Judul Makalah</th>
<th>Reproductive Performance of Buffalo in South Sulawesi (a preliminary study)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penulis Makalah</td>
<td>Effendi Abustam, Muhammad Yusuf, Abdul Latief Toleng</td>
</tr>
<tr>
<td>Identitas Makalah</td>
<td>a. Judul Prosiding : Prosiding pada Buffalo International Conference 2013</td>
</tr>
<tr>
<td></td>
<td>b. ISBN : 978-602-70032-0-0</td>
</tr>
<tr>
<td></td>
<td>c. Tahun Terbit : 2013</td>
</tr>
<tr>
<td></td>
<td>d. Penerbit : Faculty of Animal science Hasanuddin Univ.</td>
</tr>
<tr>
<td></td>
<td>e. Jumlah halaman : 6 (288-294) (132 - 137)</td>
</tr>
</tbody>
</table>

Kategori Publikasi Makalah : [ ] Prosiding Forum Ilmiah Internasional  [ ] Prosiding Forum Ilmiah Nasional

(beri pada kategori yang tepat)

Hasil Penilaian Peer Review:

<table>
<thead>
<tr>
<th>UNSUR</th>
<th>Nilai</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Peper Review 1</td>
</tr>
<tr>
<td>a. Kelengkapan unsur isi makalah (10%)</td>
<td>1.5</td>
</tr>
<tr>
<td>b. Ruang lingkup dan kedalaman pembahasan (30%)</td>
<td>4.0</td>
</tr>
<tr>
<td>c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)</td>
<td>4.0</td>
</tr>
<tr>
<td>d. Kelengkapan unsur dan kualitas penyelesaian (30%)</td>
<td>4.0</td>
</tr>
<tr>
<td>Total = (100%)</td>
<td>13.5</td>
</tr>
</tbody>
</table>

**Catatan:**
Rekapitulasi digunakan jika penilaian 2 (dua) teman sejawat dalam lembar terpisah
**LEMBAR HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW KARYA ILMIAH : PROSIDING**

Judul Makalah : Reproductive Performance of Buffalo in South Sulawesi (a preliminary study)

Penulis Makalah : Effendi Abustam, Muhammad Yusuf, Abdul Latief Toleng

Identitas Makalah :
- a. Judul Prosiding : Buffalo International Conference 2013
- b. ISBN : 978-602-70032-0-0
- c. Tahun Terbit : 2013
- e. Jumlah halaman : 6 (132-137)

Kategori Publikasi Makalah (beri √ pada kategori yang tepat) :
- [ ] Prosiding Forum Ilmiah Internasional
- [x] Prosiding Forum Ilmiah Nasional

Hasil Penilaian Peer Review :

<table>
<thead>
<tr>
<th>Komponen Yang Dinilai</th>
<th>Nilai Maksimal Prosiding</th>
<th>Nilai Akhir Yang Diperoleh</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Kelengkapan unsur isi buku (10%)</td>
<td>1,5</td>
<td>1,5</td>
</tr>
<tr>
<td>b. Ruang lingkup dan kedalaman pembahasan (30%)</td>
<td>4,5</td>
<td>4</td>
</tr>
<tr>
<td>c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)</td>
<td>4,5</td>
<td>4</td>
</tr>
<tr>
<td>d. Kelengkapan unsur dan kualitas penerbit (30%)</td>
<td>4,5</td>
<td>4</td>
</tr>
<tr>
<td>Total = (100%)</td>
<td>15,0</td>
<td>13,5</td>
</tr>
</tbody>
</table>

Ket.mahar, 17-10-2014

Reviewer

Prof. Dr. Ir. Amin Aziz, M.Sc
NIP: 196412311989031026
Unit kerja: Fak. Peternakan
<table>
<thead>
<tr>
<th>Komponen Yang Dinilai</th>
<th>Nilai Maksimal Prosiding</th>
<th>Nilai Akhir Yang Diperoleh</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Internasional</td>
<td>Nasional</td>
</tr>
<tr>
<td>a. Kelengkapan unsur isi buku (10%)</td>
<td>1,5</td>
<td>1</td>
</tr>
<tr>
<td>b. Ruang lingkup dan kedalaman pembahasan</td>
<td>4,5</td>
<td>3</td>
</tr>
<tr>
<td>(30%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Kecukupan dan kemutahiran data/informasi</td>
<td>4,5</td>
<td>3</td>
</tr>
<tr>
<td>dan metodologi (30%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Kelengkapan unsur dan kualitas penerbit</td>
<td>4,5</td>
<td>3</td>
</tr>
<tr>
<td>(30%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total = (100%)</td>
<td>15,0</td>
<td>10</td>
</tr>
</tbody>
</table>

Hasil Penilaian Peer Review:

Reviwer: [Signature]

NIP: 196810051993011001

Unit kerja: [Unit kerja]

Lembaga:

Hasil Penilaian Sejawat Sebidang atau Peer Review Karya Ilmiah: Prosiding

Judul Makalah: Reproductive Performance of Buffalo in South Sulawesi (a preliminary study)

Penulis Makalah: Effendi Abustam, Muhammad Yusuf, Abdul Latief Toleng

Identitas Makalah:

- a. Judul Prosiding: Buffalo International Conference 2013
- b. ISBN: 978-602-70032-0-0
- c. Tahun Terbit: 2013
- d. Penerbit: Fakultas Ilmu Pertanian, Universitas Hasanuddin
- e. Jumlah halaman: 6 (132-137)

Kategori Publikasi Makalah:

☑ Prosiding Forum Ilmiah Internasional
☐ Prosiding Forum Ilmiah Nasional
# TABLE OF CONTENT

**Buffalo International Conference 2013**

<table>
<thead>
<tr>
<th>KEYNOTE SPEAKER</th>
<th>The policy of buffalo development in Indonesia</th>
<th>1 - 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Suswono</strong> (minister of agriculture of the republic of Indonesia)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INVITED SPEAKER</th>
<th>Buffalo livestock and products in Europe</th>
<th>5 - 31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antonio Borghese</td>
<td>..........................................................</td>
<td></td>
</tr>
<tr>
<td>Can we transform Asian swamp buffaloes to important producers of milk and meat?</td>
<td>32 - 47</td>
<td></td>
</tr>
<tr>
<td><strong>Libertado C. Cruz</strong></td>
<td>..................................................................</td>
<td></td>
</tr>
<tr>
<td>Role of the water buffalo in rural livelihoods in Asia and challenges for future research to improve reproductive efficiency and productivity</td>
<td>48 - 56</td>
<td></td>
</tr>
<tr>
<td>B. M. A. Oswin Perera</td>
<td>..................................................................</td>
<td></td>
</tr>
<tr>
<td>Rural development with the emphasis on the significant role of buffalo raising in developing countries</td>
<td>57 - 78</td>
<td></td>
</tr>
<tr>
<td>Hamid reza Nader fard</td>
<td>..................................................................</td>
<td></td>
</tr>
</tbody>
</table>

| | Buffalo Reproduction: Problems and Current Technologies | 79 - 89 |
| | Baharuddin Tappa | .......................................................... |
| Availability of feed to support buffalo development in Indonesia | 90 - 95 |
| M. Winugroho and Yeni Widiawati | .......................................................... |

| | Buffalo production and research in Indonesia: obstacles and opportunities | 96 - 102 |
| | Suhubdy Yasin | .......................................................... |

<table>
<thead>
<tr>
<th>ORAL PRESENTATION</th>
<th>In vitro maturation of bubaline oocytes using bubaline (Swamp Buffalo) follicular fluid</th>
<th>103 - 108</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>F. P. Aquino, and M. B. Ocampo</strong></td>
<td></td>
</tr>
<tr>
<td>Improving the reproductive performance of buffaloes in Sabah, Malaysia</td>
<td>109 - 114</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>O. Rafidah, A. B. Zuki, K. Azhar, M. Zamri-Saad</strong></td>
<td></td>
</tr>
</tbody>
</table>
Reproductive performance of post-partum swamp buffaloes (Bubalus bubalis) reared conventionally in the Poso Regency Central Sulawesi
Y. Mberato, M. Hamsun, Fatmawati Saloko, Mirajuddin .......................... 115 – 121

Potrait of reproductive management implementation on Buffalo Breeding in Bombana District
La O de Nafiu dan Takdir Saily ............................................................... 122 – 131

Reproductive Performance of Buffalo in South Sulawesi (A preliminary study)
Effendi Abustam, Muhammad Yusuf, Abdul Latief Toleng .......................... 132 – 137

Transfer passive of antibody by using the immunoglobulin as protein nutrient in colostrum in response to the mortality rate in buffaloes
Laurentius J. M. Rumokoy ........................................................................ 138 – 141

Morphometric Studies on the Ruminant Kidneys: Buffalo, Cattle and Goat
D.P. Raha, T. R. Utomo, and H. Sonjaya ...................................................... 142 – 145

Effects of Flushing and Milk Replacer on Improving the Productivity of Dairy Buffaloes and Their Calves

The Study of Individual Lactation Curves of Two Iranian Buffalo Ecotypes
D. Kianzad, S. A. R. Seyyedalian, K. Hasanpur and A. Javanmard .............. 160 – 166

Agricultural By-Products as Total Mixed Rations for Buffaloes
Dahlan Ismail ............................................................................................. 167 – 184

Potential Feed Resources for Swamp Buffaloes (Bubalus Bubalis) Raised Under Oil-Palm Ecosystem
M. Wan Zahari, A. R. Alimon and S. Shanmugavelu ................................. 185 – 191

Study on Buffalo Fattening Using Agricultural Waste Based Feed in Fattening of Buffalo Through Feed Based At Tana Toraja District
A. Nuryahyu, Matheus Sariubang, Andi Baso L. Ishak dan A. Natsir .......... 192 – 197

Appropriate Forage Management in Coconut Plantation Crops
David A. Kaligis and Selvie D. Anis .......................................................... 198 – 206

Buffalo meat as a healthy food
Muhammad Rusdy ..................................................................................... 207 – 210
Production of Mozzarella Cheese from buffalo’s milk using direct acidification technique

Joy Christine V. Sta Cruz, L. C. Ocampo and M. P. Abella .............................. 211 – 218

Value Adding of Buffalo Meat Imported from India in Processed Meat Products

Abdul Salam Babji and Komate Ramaya ........................................................... 219 – 228

Isolation of lactic acid bacteria as a potential probiotic in dangke, a traditional food from buffalo milk in curio the district of Enrekang

Fatmawati Nur ................................................................................................. 229 - 236

Potential use of buffalo skin as a raw material for leather tanning industry in Indonesia

M. Irfan Said dan Amriana Hifizah ................................................................. 237 - 243

Rambu Solo and Buffalo at Tana Toraja of South Sulawesi

Ikrar Mohammad Saleh, S. N. Sirajuddin, and M. Aminawar ..................... 244 – 249

Forecasting demand for buffalo in North Toraja district, South Sulawesi province

V.S. Lestari, St. Rohani and I. Rasyid ............................................................... 250 – 253

Transaction costs in marketing buffalo in North Toraja, South Sulawesi

S. N. Sirajuddin, K. Kasim, M. B. Rombe, and Palmarudi ............................... 254 – 257

Future prospect for buffalo development in West Sulawesi Province based on reproductive management applied

Muhammad Yusuf, Sudirman Baco, Muhammad Nasir Karim ...................... 258 – 264

Study on housing, feeding and management raising of swamp buffalo in highland area of Jayawijaya Papua

Meos Dapla, Andoyo Supriyantono, Deny A. Iyai ........................................ 265 - 268

Buffalo development in Aceh Province

Samadi ............................................................................................................. 269 – 275

Strategy in Developing Sustainable Buffalo Breeding in South Sulawesi

Muhammad Anshar, Sjamsuddin Rasjid, and Syamsuddin Hasan ............... 276 - 285

The potential of buffalo livestock development by optimizing the grazing lands management in Riau Province

Winda Syafitri and Hastuti Handayani S. Purba .............................................. 286 – 291

Strategic Program of Buffalo Development in South Sulawesi: An Idea and Concepts

Syahruddin Said .............................................................................................. 292 – 299
The sensory properties and flavor characteristics of meat of cattle and buffalo fed with protected lemuru fish (Bali sardinella) oil in ration in the form of dried carboxylate salt mixture (DCM)

Yurleni, U. Amri, Z. Zafrullah, Mardalena and M. Afdal ...................... 300 – 307

Rearing system local buffalo in Lore and Lindu highlands of Central Sulawesi

F. F. Munier and Mohammad Takdir .............................................................. 308 – 315

The Role of Agents on the Marketing of Buffalo in North Toraja

Kasmiyati Kasim, Veronika Sri Lestari, Hastang, T. Rasyid ..................... 316 – 320

The decline of buffalo population in the modernization era of rice agriculture

Basir Paly ........................................................................................................... 321 – 328

Antibacterial activity of fermented whey beverage by products from buffalo dangke

Fatma, Ratmawati Malaka, Hajrawati and Muhammad Taufik ............ 329 – 334

Identification of farmer needs on technology innovation for buffalo development in North Toraja

Agustina Abdullah, Martha B. Rombe, Veronica Sri Lestari, M. Anshar, and Mawardi ................................................................. 335-339
REPRODUCTIVE PERFORMANCE OF BUFFALO IN SOUTH SULAWESI
(A PRELIMINARY STUDY)

Effendi Abustam, Muhammad Yusuf, Abdul Latief Toleng

Department of Animal Production, Faculty of Animal Science,
Hasanuddin University, Makassar 90245, Indonesia
effendiabu@hotmail.co

ABSTRACT

This was a preliminary study that aimed to describe the reproductive performance of buffalo in South Sulawesi. The study was conducted in three different districts; Tana Toraja (R1), Enrekang (R2), and Wajo (R3). The number of buffalo involved in the present study was 147, 149, and 152 in R1, R2, and R3, respectively. Primary data were collected with the help of a questionnaire in interviewing the farmers and secondary data was obtained from livestock services in each region. The results of this study showed that the age at first buffalo heifers calved was >3.5 years; 91.9%, 71.9%, and 54.2% in R1, R2, and R3, respectively. The remaining buffalo heifers were calving ≤3.5 years of age. Days to first breeding after calving differed significantly (P<0.05) at different districts. In the region of R3 the number of buffalo bred within six months after calving was significantly (P<0.05) higher than in R2 and R1 (67.2% vs 38.0% and 56.6%). Furthermore, the number of buffalo first bred >12 months was significantly (P<0.05) higher in R2 in comparison to R1 and R3 (41.0% vs 20.9% and 19.5%). Moreover, calving interval within 18 months differed significantly (P<0.05) at different districts. In the region of R3, the number of buffalo with calving interval within 18 months was 56.3%; significantly (P<0.05) higher than in R1 and R2; 47.5% and 44.6%, respectively. In conclusion, reproductive performance of buffalo in South Sulawesi based on primary data collected from the farmers showed much better in the region of R3 in comparison to R1 and R2. Therefore, it is necessary to improve the reproductive performance in the two regions.

Keywords: Buffalo, Reproductive performance, South Sulawesi.

INTRODUCTION

Buffalo has been an integral part of livestock agriculture in Asia for over 5000 years producing draft power, milk, meat and hides (Nanda and Nakao, 2003).

It has been stated that buffalo population of the world increased from 88.32 millions in 1961 to 177.25 millions in 2007 with an increase of over 100% (Pasha and Hayat, 2012). Moreover they noticed that maximum growth per annum in buffalo production occurred from 1961 to 1971; 2.31%. This growth was decreased to 1.43% during 1971-1981 and 1.09% during 2001-2007, respectively. Contrary, in Indonesia in the same period, buffalo population was decreased from 2.89 millions in 1961 to 2.09 in 2007. In Indonesia, the causes of this problem were not really understood. Most probably that this problem initiated by
transformation of field rice mechanization from animals including buffalo to machine resulting in decreasing of raising buffalo by the farmers. This may due to that in Indonesia buffalo purpose especially in rural area in the last time are mainly for mechanical power in the field as well as for meat and milk. In recent years onward, the main purpose of buffalo has been change for meat and milk production as a substitute in supporting demand for red meat. Therefore, it is necessary to increase buffalo production in Indonesia.

In order to increase buffalo production, there is a necessity to cover the problems as the causes of limiting growth of buffalo population. These problems should properly describe specifically in order to solve the problems including reproductive performance. To our knowledge, most reports of buffalo in Indonesia described about production and socio-economic, but lacked detailed characterization of reproductive performance especially in South Sulawesi Province that is having different area where the buffalo raised by the farmers. Therefore, the objective of this study was to describe the reproductive performance of buffalo in South Sulawesi.

**MATERIALS AND METHODS**

**Animals and management**

A total of 448 buffalo cows from three different districts (Tator; R1, Enrekang; R2, and Wajo; R3) in South Sulawesi were enrolled in the present study. The number of buffalo at different districts was 147, 149, and 152 in R1, R2, and R3, respectively. All buffalo in all districts where housed in the night-time and free in the day-time for grazing. However, the farmers in R1 raised the buffalo slightly more intensive than in R2 and R3 especially in feeding the animals. In R1, feeding system was mostly “cut and carry” in combination to grazing. While in R2 and R3, the buffalo were fully grazing in the field.

**Data Collection**

Primary data were collected with the help of a questionnaire in interviewing the farmers and secondary data was obtained from livestock services in each region. For primary data, the following data were recorded for each animal: age at first calving, days to first breeding, and calving interval.

**Statistical Analysis**

All data were presented in percentage. The percentage of buffalo cows that first calved >3.5 y and ≤3.5 y, first bred ≤6 m and >12 m, and calving interval ≤18 m at different districts were compared using Chi-square test. All calculations were performed using the statistical package SPSS16.0 for windows (SPSS Inc., Chicago, IL, USA).
RESULTS AND DISCUSSION

A total of 448 buffalo cows were used in the present study, and they were involved for further analysis. In Figure 1 shows that out of 147 buffalo heifers in R1, it was only 8.1% first calved within 3.5 years old age. The remaining 91.9% buffalo heifers were first calved greater than 3.5 years old age. The percentage of first calving buffalo heifers within 3.5 years old age in R1 shows lower than the percentage of in R2 and R3, whereas the first calving of buffalo heifers in R2 and R3 within 3.5 years old age were 28.1% and 45.8%, respectively. Perera (2011) stated that the factors that influence the buffalo heifers attain puberty are genotype, nutrition, management social environment, climate, year of season of birth and diseases.

Basically, lower number of buffalo heifers first calving in the present study might be affected by reproductive problems. Most probably they were suffering from delayed puberty. Terzano et al. (2012) stated that inherent reproductive problems such as delayed puberty, higher age at first calving, long post partum anestrus period, long inter-calving period, silent heat coupled with poor expression of estrus, seasonality in breeding and low conception rate limit the productivity of buffalo. Furthermore, lack of integration or synchronization or endocrine imbalances at this phase may result in reproductive failure.

Figure 1. Percentage of buffalo cows that first calved >3.5 y and ≤3.5 y at different districts

Figure 2 shows the percentage of buffalo cows that first bred within six months and greater than 12 months after calving at different districts. Days to first breeding after calving differed significantly (P<0.05) at different districts. In the region of R3 the number of buffalo bred within six months after calving was significantly (P<0.05) higher than in R2 and R1 (67.2% vs 38.0% and 56.6%). Furthermore, the number of buffalo first bred >12 months was significantly (P<0.05) higher in R2 in comparison to R1 and R3 (41.0% vs 20.9% and 19.5%).
Delayed breeding of buffalo cows after calving prolong conception, pregnancy, calving and subsequently reduce probability of getting many offspring during their lifetime. Perera (2011) stated that buffalo are polyestrous and are capable of breeding throughout the year. Several factors that affecting delayed breeding after calving include grazing system in relation to the season (Perera et al., 1987), climate and nutrition (Kaur and Arora, 1982), and region (Vale et al., 1990). Therefore, in order to improve reproductive performance of buffalo, it is necessary to solve this problem in multiple factors including the region, nutrition, climate, management, etc.

Figure 2. Percentage of buffalo cows that first bred ≤6 m and >12 m after calving at different districts

The percentages of buffalo cows with calving interval within 18 months at different districts are shown in Figure 3. Calving interval within 18 months differed significantly (P<0.05) at different districts. In the region of R3, the number of buffalo with calving interval within 18 months was 56.3%; significantly (P<0.05) higher than in R1 and R2; 47.5% and 44.6%, respectively. The importance of calving interval in buffalo cows determines their reproductive efficiency as well as number of calves produced during their live. Higher number of calves produced by buffalo cows in a time manner is an indicative for their fertility.

Long calving interval in buffalo is affected by several factors. Peters and Ball (1987) stated that the components of calving interval are the calving to conception interval and the gestation period. Moreover they stated that the calving to conception interval is the time from parturition until the establishment of the next pregnancy. This interval is the main determinant of the calving interval, and is thus the parameter that is usually manipulated in
order to try to achieve the target calving interval. Therefore, to achieve target calving interval in this region, it is necessary to manage the buffalo especially in relation to reproductive management during postpartum period. In buffalo, the period of postpartum anestrus or anestrus is usually longer than in cattle under comparative management conditions (Dobson and Kamonpatana, 1986; Jainudeen and Hafez, 1993; Perera, 2011). To solve the problems, Perera (2011) suggested methods that are recommended for overcoming prolonged postpartum anestrus in buffalo include adequate nutrition before and after calving, restricting the suckling by calves, and alleviating heat stress by permitting wallowing or use of water sprinklers (Perera et al., 2005).

**Figure 3.** Percentage of buffalo cows with calving interval ≤18 months at different districts

**CONCLUSIONS**

Reproductive performance of buffalo in South Sulawesi based on primary data collected from the farmers showed much better in the region of R3 in comparison to R1 and R2. Therefore, it is necessary to improve the reproductive performance in the two regions.

**REFERENCES**


