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THE EFFECT OF BREED AND BODY SCORE CONDITION ON THE QUALITY AND VIABILITY OF EPIDIDYMAL BOVINE SPERM FROM POST MORTEM BULL BY IN VITRO COLLECTION METHOD

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ABSTRACT

This study was to assess two factors whether has an effect on the quality of spermatozoa collected from epididymis. This experiment was based on the effect of breed Peranakan Ongole/PO and Crossbreed: Simmental PO/Simpo, Limousine PO/Limpo and body conditionscore (BCS) of bull. Sperm samples were collected by flushing of epididymis postmortem. Motility and lives and death sperm stain by eosin nigosin. The significance of semen quality was analyzed among the groups by two-way ANOVA and Tukey-Kramer test. P value of less than 0.05 was regarded as significant. The results showed that motility of local breed PO has significantly higher (P<0.05) than the crossbreed bull Limpo and Simpo, 53.3%, 36.6% and 36.0% respectively. Viability of sperm showed that PO, Limpo dan Simpo, 78.0%, 69.6% and 54.0% respectively. This results showed that the bull with BCS 3 and 3.5 has significantly higher motility and viability than the bull with 2.5 (46.9, 51.7 % and 26.7%) respectively. Viability based on BCS showed that bull with BCS 3 and 3.5 has significantly higher than bull with BCS 2.5 (66.8 %, 78.2 % and 50.0%) respectively. In conclusion, local breed bull (PO) epididymis spermatozoa have better motility and viability than the crossbreed bull Simpo and Limpo. Moreover, bull with BCS 3 and 3.5 has better motility and viability than 2.5 BCS standard.

Key words: sperm, epididymis, motility, live and death sperm, quality, breed and BCS

INTRODUCTION

New material sperm for bovine artificial insemination need to find out as a sperm alternative beside the usual material that collected from the bull by artificial vagina collection method. Epididymis sperm is one of solved this problem (3,4). Several detail research are needed to define the best collection method and to guarantee the quality of sperm for AI (13). The aim of this study was to assess the quality of epididymis spermatozoa from bovine that collected by in vitro method of post mortem Bull from the slaughterhouse. In-vitro preservation of cauda epididymal spermatozoa at 37 degrees C with collection media for obtaining functional gametes. This study was to assess two factor whether has an effect on the quality of spermatozoa collected from epididymis. This experiment was based on the effect of breed (local group: Peranakan Ongole/PO and Crossbreed: Simmental PO/Simpo, Limousine PO/Limpo) and body score condition (BCS) of bull. Better understanding of the relationships between body condition scores and rebreeding efficiency of beef cattle has added a powerful management tool to the cattlemen’s arsenal (1, 2, 3, 5, 22). Based on local breed and cross breed have collected maturation Sperm occurred, maturation refers to the change in functional capacity that occurs in sperm during their transit through the epididymis (1, 4, 15, 19). Modification of sperm to achieve maturation requires enzymes and transfer proteins that are secreted from the epididymal epithelium into the luminal fluid (5, 13, 15, 23). The epididymis is generally divided into three functional regions; caput (head), corpus (body) and cauda (tail), where sperm undergo physiological and functional maturation (4, 6, 9, 14, 16). Sperm present in the testis or in the caput epididymis are immotile and immature, while those that reach the cauda are generally...
more motile and mature and are thought to be capable of fertilization (5, 12, 18,19). Recently the cryopreservation of sperm for several purposes such as artificial insemination (AI) collected from the bull by artificial vagina method (9, 17,19). We need the alternative of sperm material for AI, more over we need keep the genetic quality after good bull has slaughtered because of sick or age. Collection of epididymis sperm is one of solve problem this problem. Epididymis spermatozoa which collected from cauda epididymis has potential for fertilized the oocyte by in vitro method (1, 19).

Body condition scoring (BCS) is a useful management tool for distinguishing differences in nutritional needs of beef cows in the herd. This system uses a numeric score to estimate body energy reserves in the cow. Research indicates that there is a strong link between the body condition of a cow and her reproductive performance. Many factors play an important role in the economics of a beef cow-calf operation and help determine the percentage of viable calves each year for the female bovine and quality of the spermatozoa for the male one. Monitoring body condition using the BCS system is an important managerial tool for assessing production efficiency (6, 7). Crossbreeding is often regarded as an alternative to selection. It therefore needs to be stressed that these are not mutually exclusive strategies, and that any of the crossbreeding options discussed here requires a supporting selection program, either in the contributing pure breeds, or in the resulting synthetic (5,10). First, however, it is useful to set crossbreeding options in context with selection alternatives. Indonesia has many type of new crossbreeding between Peranakan Ongole (PO) and Simmental or Limousine. Some not good affect occurred recently in the field. Controle of crossbreed breeding have to support with some research for define the good and bad results following crossbreeding (11, 13). Body condition scores are excellent indicators of the nutritional status in beef cows. Ideal liveweight varies from cow to cow whereas ideal body condition (BCS 5-6) is the same for all cows (7, 8,16). Also, body condition can be measured in the field without gathering or working cattle (7). Body condition scores are numbers used to estimate energy reserves in the form of fat and muscle of beef cows. BCS ranges from 1 to 9, with a score of 1 being extremely thin and 9 being very obese. Areas such as the back, tail head, pins, hooks, ribs, and brisket of beef cattle can be used to determine BCS (7, 8, 9). The negative effect of crossbreeding overlapping the benefits of crossbreeding itself. The changing of crossbreeding showed on reproductive performant such as length of estrous cycle and duration of oestrus period (3, 5, 6).

**MATERIAL AND METHOD**

Sperm samples were collected by flushing of epididymis postmortem from each male. Samples were diluted with salt fisiologis. Motility was assessed on fresh sperm by microscope and lives and death sperm by eosin nigrosin stain was applied either in the place or in laboratory. In the laboratory the collected sperm suspensions were centrifuged at 1,200 g for 5 min, the supernatants were removed, 200 mikro litre of egg yolk Tris-fructose citrate was added to the semen and the sperm motility, sperm viability live and death presentation were assessed by stereo microscope. Motility of sperm determined by microscope on percented ten followed by staining of eosin nigrosin for live and death sperm. Single sperm with transparence head sperm counting as a live sperm and the single head of sperm with the red colour had counted as a death sperm. All the data collected based on the local breed PO and crossbreed (Simpo and Limpo) group and BCS group of bull. Statistical analysis: The significance of semen quality was analyzed among the groups by two-way ANOVA and Tukey-Kramer test. The lateral differences in the number of sperm were analyzed by Student’s t-test for after analyzing the homogeneity of variance. A P value of less than 0.05 was regarded as significant.
RESULTS

After epididymis collected as soon as possible after slaughter, followed by washing the epididymid in PBS dilution added by antibiotic. Epididymis were transported from the slaughterhouse to the laboratory on 37 °C then flushed by PBS dilution and determined the micrscopic quality and presentation of live and death sperm by eosin negrosin. The data of the results showed at table 1 and Table 2 that motility of local breed PO has body, including production of hormone and preparation of reproductive organ who responsibility for production of oocyte and spermatozoa/gamet. performance reproduction (7,8, 15). Bull with lower BCS was speculated has not enough energy for processing of sperm production. Followed by low concentration of PO bull has good quality compare crossbreed bull sperm.

Table 2. Quality of sperm epididymis collected by in vitro, based on body score condition (BCS) of bull

<table>
<thead>
<tr>
<th>Breed</th>
<th>Motility (%)</th>
<th>Live and Dead (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peranakan Ongole (PO)</td>
<td>53.3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>78.0&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Limousin-Peranakan Ongole (Limpo)</td>
<td>36.6&lt;sup&gt;b&lt;/sup&gt;</td>
<td>54.0&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Simmental-Peranakan Ongole (Simpo)</td>
<td>36.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>69.6&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Different superscript (<sup>a</sup>, <sup>b</sup>) in the same collum has significantly higher (<P<0.05>

significantly higher (<P<0.05>) than the crossbreed bull Limpo and Simpo, 53.3%, 37.5% and 35.5% respectively. Viability of the sperm showed in the similar results between PO, Simpo dan Limpo, 78%, 71% and 51.25% respectively. Furthermore, BCS has correlation with the quality of sperm epididymis. The results showed that the bull with BCS 3 and 3.5 (5 standar BCS) has significantly higher motility and viability than the bull with 2.5 (46 %, 48.33 % and 20.3 %) respectively. Viability based on BCS showed that bull with BCS 3 and 3.5 has significantly higher than viability of Bull with BCS 2.5 (77 %, 78.16 % and 42.33%) respectively. Unknown reason the correlation between crossbree bull with the quality of sperm epididymis. Many researcher reported that crossbreeding sometimes has effect on occuring the reesive gene which showed on the performance reproduction. Detail research is still running to answer this problem. Moreover, as better understanding, excellent BCS will initiate good metabolism in the

Good BCS bull had reported has big opportunity to support good performance reproduction. This results reason is speculated that crossbreed bull has changing the chromosom of bull, maybe expressed as a feotip the performance reproduction. Detail researches are needed to find the answer and proved this problem to give the reasonable answer for successfull crossbreeding AI. Moreover, material genetic of excellent quality of bull has new solution to maintained after slaughtered. After slaughter the genetic quality/chromosome has gone as weel the slaughtered bull. Collection of epididymis saving the sperm with good process that produced good quality sperm with standart of AI. The most important is the capacity of sperm fertilization followed by cleavage and yield the embryo. This research showed that the sperm epididymis has good opportunity and
they have good motility and good viability as a material for artificial insemination (AI). Frozen sperm and fresh sperm can be used for AI besides the sperm from usual method with artificial vagina.

**CONCLUSIONS**

In conclusion, local breed bull (PO) epididymis spermatozoa has better motility and viability than the crossbreed bull Simpo and Limo which collected by in vitro method. Moreover, bull with BCS 3 and 3.5 has better motility and viability than bull with 2.5 BCS standard.

**ACKNOWLEDGEMENTS**

I would like to express my deepest respect and thankful to the students of Faculty of Veterinary Science, Universitas Gadjah Mada Yogyakarta as a member of sperm epididymis research Agi, Handa, Yecho, Rida, Yecho, Didi and Pradit. They had hard worked with good dedication for doing all of the running this research.

**REFERENCE**


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REPRODUCTIVE PERFORMANCE OF CROSS BREED CATTLE IN “HANDINI MUKTI” FARMERS GROUP, SLEMAN REGENCY

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ABSTRACT

This research was conducted to evaluate cross breed cattle reproductive performance in “Handini Mukti” Farmers Group. Using 39 cross breed cattle (8 heads of Limousine Cross Breed, 10 heads of Ongole Cross Breed and 21 heads of Simmental Cross Breed). This method were survey and rectal palpation. The variables that observed were: body condition score (BCS), calving interval (CI), and services per conception (S/C). The data was calculated mean and deviation standard and analyzed descriptively. Body Condition Scores, Calving Interval, and Service/Conception of Limousine Cross Breed were 2,78 ± 0,36; 15 ± 2,71 and 1,20 respectively. Those scores were better than Ongole Cross Breed (2,48 ± 0,51; 18 ± 3,66; 2,00) and Simmental Cross Breed (2,64 ± 0,47; 16,11 ± 2,45; 5,33) that kept by “Handini Mukti” Farmers Group. Although the Limousine’s scores were better from the other, the value of BCS and CI were not in a normal standard of Reproductive Performance. In conclusion, reproductive performance (BCS, CI and S/C) of cross breed cattle in “Handini Mukti” Farmers Group is in poor category.

Key words: reproductive performance, cross breed cattle, Small Holder

INTRODUCTION

The most important factors affecting both biological and economic efficiency in cattle are reproductive performance [1]. Intensive and semi-intensive system are popular farming management in Javanese culture with each advantages and disadvantages [2].

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Condition Score (5 scale)</td>
<td>3</td>
</tr>
<tr>
<td>Services /Conception</td>
<td>1,5-2</td>
</tr>
<tr>
<td>Calving Interval (months)</td>
<td>12</td>
</tr>
</tbody>
</table>

This research was conducted to evaluate cross breed cattle reproductive performance in “Handini Mukti” Farmers Group.

MATERIALS AND METHODS

The materials used on this research were 39 cross breed cattle (8 heads of Limousine Cross Breed, 10 heads of Ongole Cross Breed and 21 heads of Simmental Cross Breed). The methods that used in this research were survey and rectal palpation. The variables that observed were: body condition score (BCS), calving interval (CI), and services per conception (S/C). The data was calculated mean and deviation standard and analyzed descriptively.
RESULT

The result showed on the Table 2.

Table 2. Three aspects of Reproductive Performance that evaluated in this research

<table>
<thead>
<tr>
<th>Breed (n)</th>
<th>BCS (5 scales)</th>
<th>CI (months)</th>
<th>S/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limousine Cross</td>
<td>2.78 ± 0.36</td>
<td>15 ± 2.71</td>
<td>1.20</td>
</tr>
<tr>
<td>Breed (8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ongole Cross</td>
<td>2.48 ± 0.51</td>
<td>18 ± 3.66</td>
<td>2.00</td>
</tr>
<tr>
<td>Breed (10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simmental Cross</td>
<td>2.64 ± 0.47</td>
<td>16.11 ± 2.45</td>
<td>5.33</td>
</tr>
<tr>
<td>Breed (21)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DISCUSSION

Intensive system that used by “Handini Mukti” Farmers Group is the common system in cattle farming. Cattle were in a household/barn with narrow exercise place. Feeding gave twice a day with controlled grass and water [2]. That system is the best choice for traditional farmer (small holder) in Java because they just have small land to make a household for keeping their cattle [4]. However, the cost of providing feed for the cattle is a substantial proportion of the total costs. Cutting and carrying grass or water gave benefit for feeding cost [2] but if ignoring the number and balance energy might be harmful for reproductive performance [1, 5].

Body condition of all breeds was not in optimum score. There were less than 3 and it means reproductive performance would be on critical point. That situation caused all breeds had prolonged CI and Ongole Cross Breed had the worst. Limousine and Ongole Cross Breed had an ideal S/C but Simmental Cross Breed need 5,33 services to get a pregnancy. After all, Limousine Cross Breed has BCS, CI and S/C better than other breeds.

It is important that such a practice does not compromise subsequent reproductive performance. Cattle with better body condition had a higher pregnancy rate and influenced subsequent reproductive performance [5]. The high nutrition ensures good reproductive performance[2].

CONCLUSION

In conclusion, reproductive performance (BCS, CI and S/C) of cross breed cattle in “Handini Mukti” Farmers Group is in poor category.

REFERENCES


THE ESTRUS PERFORMANCE OF CROSS-BRED COWS IN NANGGULAN SUB-DISTRICT, KULONPROGO DISTRICT

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ABSTRACT

The present research aims to study estrus performance in cross-bred cows which are cows as result of a cross between Ongole (PO) and Simmental (SIMPO) and Ongole and Limousine (LIMPO). The research used 30 beef cows that contain of 10 PO cows, 10 SIMPO cows, and 10 LIMPO cows. This research used a survey method by direct observation on the cows and an interview to the farmers. The Data collected includes the cows breed, the age of puberty, estrus duration, service per conception, as well as other data supporters such as reproductive management, feeding and drinking. The cow observation conducted during three cycles of estrous. The result indicates the age of puberty of LIMPO and SIMPO tend to be faster than PO. The observations made during the estrous cycles showed that estrus duration (1st, 2nd, 3rd) was longer on LIMPO and SIMPO than PO (18, 33, 30 hours; 35, 24, 16 hours; and 16, 8, 20, 18 hours respectively). Service per conception in PO, LIMPO, and SIMPO were 1.8 ± 1.2; 1.5 ± 0.5; and 2.2 ± 0.9 respectively. SIMPO need more services to produce pregnancy when compare to LIMPO and PO.

Key words: estrus, cross-bred cows

INTRODUCTION

In Indonesia, there are several breed of beef cattle, such as local breed, imported cattle, and cross-bred cattle obtained from artificial insemination (AI) program. Quality improvement efforts of local cows (especially PO) one of which by crossbreeding with Simmental or Limousine breed in order to produce high quality beef cattle called SIMPO (a cross Simmental and PO) and LIMPO (a cross Limousine and PO). The selection of that breed is considered appropriate since he is a beef cattle with daily average gain is 1.2-1.4 kg/day. The genetic improvement of farm animals will be success by maintaining the reproductive rate. Performance of reproductive could be indicated by some parameters such as aged of puberty, Calving Interval (CI), Service per Conception (S/C) and Non-Return Rate (NRR). Reproductive performance of beef cattle in Indonesia was generally low [1]. In difficult conditions of feed resources, cows results from a cross to be skinny, the body condition become worse and result in decreased reproductive performance, such as high in S/C, indicating less successful artificial insemination. In good maintenance, the reproductive performance of crossbreeding cows could be good. On the other hand, in local cows, insufficient of feed, it only influence the BCS, but they still show estrus signs, ovulate and could be pregnant when inseminated. Based on the explanation above, we wished to know the estrus performance especially in PO cattle compared to SIMPO and LIMPO cattle.

MATERIALS AND METHODS

The research used 30 beef cows that contain of 10 Ongole (PO) cows, 10 SIMPO cows, and 10 LIMPO cows. The cow ages were between 4-7 years. The cows used were beef cattle belongs to the livestock group Majusari in NanggulanSub-district, Kulon Progo District, Yogyakarta Special Region.

This research used a survey method by direct observation on the cows and an interview to the farmers. The data collected includes the cows breed, the age of puberty, estrus duration, service per conception, as well as other data supporters like reproductive management, feeding and drinking. The cows observation conducted during three cycle
of estrous including estrus signs and duration. The data obtained were then analyzed descriptively.

RESULTS

The observations in the field note that cattle at Livestock Group, Majusari, Nanggulan, Kulon Progo Regency is kept in the traditional farm. The enclosure is made of wood and bamboo, some of the tile roof, zinc or asbestos. Ground floor enclosures in general, but some of them are plastering cement. Feed given is a mixture of grasses and legumes, by administering done 2-3 times a day. The cattle were lack of exercise because they mainly kept in barn all day. Body condition score (BCS) of PO, SIMPO and LIMPO cattle were 2-2,75, 2,8-3,12, and 2,5-3 from the 1-5 scales (Table I).

Table I. Mean of estrus duration in PO, LIMPO and SIMPO in Nanggulan sub-district, Kulon Progo district.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>PO</th>
<th>LIMPO</th>
<th>SIMPO</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCS</td>
<td>2-3</td>
<td>2,5-3</td>
<td>2,8</td>
</tr>
<tr>
<td>Estrus duration I (hours)</td>
<td>16,8</td>
<td>18</td>
<td>35,3</td>
</tr>
<tr>
<td>Estrus duration II (hours)</td>
<td>20</td>
<td>33</td>
<td>24</td>
</tr>
<tr>
<td>Estrus duration III (hours)</td>
<td>18</td>
<td>30</td>
<td>16</td>
</tr>
</tbody>
</table>

In this research, estrus signs were not obviously observed in PO, SIMPO, and LIMPO, there were no redness or swollen of their vulva. The observations made during 3 cycles of estrous showed that estrus duration as longer on LIMPO and SIMPO than PO respectively 18, 33,30 hours; 35, 24, 16 hours; and 16,8, 20, 18 hours (Table I). The estrus duration of SIMPO and LIMPO varies greatly in each cycles, it’s might be the problem to get inseminate in time. It shown by S/C of PO, LIMPO, and SIMPO 1,8 ± 1,2; 1,5 ± 0,5; and 2,2 ± 0,9 respectively (Table II). The success of the implementation of artificial insemination programs one of which is determined by the precision of estrus detection in order to inseminate at the proper time [2].

Table II. Reproductive parameters in PO, LIMPO and SIMPO in Nanggulan sub-district, Kulon Progo district.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>PO</th>
<th>LIMPO</th>
<th>SIMPO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ages (years)</td>
<td>5-12</td>
<td>2-7,5</td>
<td>4,8 ± 1,2</td>
</tr>
<tr>
<td>Puberty (months)</td>
<td>22,8 ± 2,4</td>
<td>20,6 ± 3,8</td>
<td>17,4 ± 3,3</td>
</tr>
<tr>
<td>First mating</td>
<td>23 ± 2</td>
<td>20,6 ± 3,8</td>
<td>18,5 ± 3,2</td>
</tr>
<tr>
<td>(months)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S/C</td>
<td>1,8 ± 1,2</td>
<td>1,5 ± 0,5</td>
<td>2,2 ± 0,9</td>
</tr>
</tbody>
</table>

The performance of reproduction in PO and LIMPO were only slightly different, but it differed greatly if compared with SIMPO. The average age of puberty in PO 22,8 ± 2,4 months, SIMPO 17,4 ± 3,3 months, and LIMPO 20,6 ± 3,8 months (Table II). There are several factors influence age of puberty such as breed, climate, management, and feeding [3]. Puberty will be achieved later in tropical climate compared to subtropical climate [4].

Management influencing will be seen when cattle kept in barn all day, they will reach puberty later than the cattle which isnot. Another factor that caused LIMPO and SIMPO reached puberty earlier compared to PO is that their body weight raised faster.

CONCLUSIONS

The puberty age of LIMPO and SIMPO tend to be faster than PO, with S / C of LIMPO lower than PO and SIMPO. Estrus duration of LIMPO and SIMPO longer than PO. Based on the estrus duration in LIMPO and SIMPO varying greatly hence advisable to conduct similar study with more cattle involves so that it result will describe the performance of reproductive more accurate.

REFERENCES

