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**Acknowledgement**

This study was a part of project work funded by ICAR on ‘Outreach Program on Ethno Veterinary Medicine.’ The authors are thankful to ICAR, New Delhi for providing financial assistance to carry out the study.

**References**


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**References**


**Effect of Age and Stage of Reproductive Cycle on Oocyte Recovery Rate and Quality of Oocyte in Dogs**

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**Abstract**

Recovery rate of cumulus-oocyte complexes as well as quality of the oocyte could be affected by the estrous phase and age of the donor bitch. The present study was conducted in 102 bitches presented to small animal gynaecology operation theatre of Madras Veterinary College, Teaching Hospital for ovariohysterectomy (OHE). Based on the stage of estrous cycle which was ascertained by morphological appearance of ovaries, they were classified in to three groups viz. follicular, luteal and anestrous phase. Recovery rate and quality of cumulus-oocyte complexes of various phase of estrous cycle and two different age groups was assessed.

**Key words:** Oocyte recovery rate, Estrous cycle, Bitch

Development of reproductive technolo-

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surgery. Ovarian morphology categorized into one of the three stages such as follicular (Fig 1), luteal (Fig 2) and anestrus. The ovaries were trimmed and cumulus oocyte complexes (COCs) were retrieved by slicing the ovaries. Oocytes were screened under stereo zoom microscope and classified into grade 1 (Fig. 3), grade 2 (Fig. 4) and grade 3 (Fig. 5) as described by Hewitt et al. (1998).

**Results and Discussion**

The mean oocyte recovery rate and quality of oocytes recovered and its correlation with different stages of estrous cycle in bitches are presented in Table I. The oocyte recovery rate and quality of oocytes recovered were found to be significantly higher during follicular stage of estrous cycle compared to other stages.

The study of Hewitt and England (1997) concluded that the recovery rate might be affected by the stage of the estrous cycle. In contrast, Lopes et al. (2007) reported that presence or absence of ovarian structures (follicles, CL, cysts) did not influence the oocyte recovery rate. In addition, Rodrigues and Rodrigues (2003) from their study concluded that ovarian reproductive phase had no effect on the quality of the recovered COCs. The results of the present study shows that the mean (± SE) oocyte recovery rate and grade-1 oocytes obtained during follicular stage was significantly higher compared to other stages of estrous cycle. This finding indicates that stage of estrous cycle influence the recovery rate and quality of oocytes.

The mean oocyte recovery rate and quality of oocytes recovered and its correlation with age of bitches are presented in Table II. The mean (± SE) oocyte recovery rate and quality (grade-1) of oocytes recovered were found to be significantly higher in bitches with less than three years of age compared to bitches aged more than three years. This finding was in accordance with the

<table>
<thead>
<tr>
<th>Stage of Estrous cycle</th>
<th>Grades of oocytes (Mean±S.E)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Grade 1</td>
</tr>
<tr>
<td>Follicular (n=46)</td>
<td>24.93±1.799&lt;sup&gt;bc&lt;/sup&gt;</td>
</tr>
<tr>
<td>Luteal (n=60)</td>
<td>13.93±1.168&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Anestrus (n=98)</td>
<td>16.85±1.028&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Means bearing different lowercase superscript differs significantly between different grades of Oocyte; Mean bearing different uppercase superscript differs significantly between stage of cycle; p≤0.01: Highly Significant**

**Table I. Influence of stage of estrous cycle on mean (±S.E) oocyte recovery rate and quality of oocytes.**

![Fig. 1: Ovarian morphology - Follicular phase](image1)

![Fig. 2: Ovarian morphology - Luteal phase](image2)
reports of Holst et al. (2001) and Lopes et al. (loc. cit.). The age of the oocyte donor bitches has a direct effect on the number of recovered oocytes, and the mean rate of recovery decreases about 4 COCs per year as reported by Rodrigues and Rodrigues (loc. cit.). Telfer and Gosden (1987) correlated the oocyte recovery rate with the number of follicles present in the ovary and reported that follicular number declined from 85,000 in 1-2 year old bitches to only 3000 in 7-11 year old bitches. Further, the quality of the oocytes differed significantly based on the age i.e. young animals yield significantly more grade 1 oocytes than the elderly. Reason for the more number of oocytes recovery in the present study might be due to presence of more number of polycystic follicles in young age group (Reynaud et al., 2012) this polycystic follicles are rare in women or mice (<0.2%) but frequently found in the bitch and represents as much as 15 per cent of the follicle population (with up to 17 oocytes in one follicle).

**Summary**

There was a revelatory effect of the bitch age and stage of cycle on the number of cumulus-oocyte complexes recovered and quality of the oocyte recovered in this study and this present data indicates that younger age group and bitch in follicular phase of estrus cycle could be best suited for oocyte recovery.

**References**


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**Table II. Influence of age on mean (±SE) oocyte recovery rate and quality of oocytes**

<table>
<thead>
<tr>
<th>Age of Donor</th>
<th>Grades of oocytes (Mean±S.E)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade 1</td>
</tr>
<tr>
<td>&lt; 3 years (n=118)</td>
<td>24.21±0.970</td>
</tr>
<tr>
<td>&gt; 3 years (n=86)</td>
<td>10.61±0.712</td>
</tr>
<tr>
<td>t value</td>
<td>11.067(0.000)**</td>
</tr>
</tbody>
</table>

*ps<0.01: Highly Significant***


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**Replacement of Maize by Wheat Bran on Energy Utilization in Pigs**

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**Abstract**

Thirty weaned Large White Yorkshire (LWY) piglets were randomly divided into three groups and were allotted to the three dietary treatments, T1 (control ration as per NRC, 1998), T2 (50 per cent of maize of control ration replaced by wheat bran) and T3 (100 per cent of maize of control ration replaced by wheat bran). Digestibility trial was conducted following total collection method and gross energy was estimated using bomb calorimeter. The estimation of gross energy of feed and faeces were reported.

**Key words:** Maize, Wheat bran, Pigs, Energy.

Cereal grain forms the major source of energy in the swine feed. Even though, India produces more than 20 million MT of maize per year, it could meet only 60 per cent of the requirement in the country. The lower availability and increasing price of maize, necessitates an alternative energy source for incorporation into the swine feed. Studies on the effects of adding wheat bran to swine diets have yielded variable results.

*Bhar et al. (2000)* reported that maize can be completely replaced by wheat bran without any adverse effect on their feed intake, body weight and carcass characteristics. Brouns *et al.* (1995) also used wheat bran at 67 per cent without any bad effect. Kyriazakis and Emmans (1995) found decreased feed intake when fibrous feed materials like wheat bran added at higher levels. But study on energy utilization of pigs by feeding of wheat bran is scanty. Hence the present experiment was conducted to assess the effect of replacement of maize by different levels of wheat bran on energy utilization by pigs.

**Materials and Methods**

Thirty weaned female Large White Yorkshire piglets were randomly divided into three groups with five replicates in each group. Each replicates were allotted with two piglets and housed...