Estimates of Heritabilities and Genetic Correlations of Litter
Size and Body Weight in Swine

B. Y. Rhee, S. B. Chung* and H. Y. Park
College of Animal Husbandry, Kon-Kuk University

Summary

This study was conducted to estimate the heritabilities, genetic, phenotypic and environmental correlations among litter size, body weights at birth and weaning in swine.

The data analysed were recorded from 2794 male pigs produced by 282 boars of Hampshire, Yorkshire, Landrace, Duroc and Crossbreed raised at Duk Won-farm in Inchon from 1983 to 1984.

The results obtained are summarized as follows:

1. The least square means over all litters studied were 9.86±0.13 pigs at birth, 8.57±0.13 pigs at weaning. Crossbred Yorkshire and Landrace tended to be larger than Hampshire or Duroc in both traits.

2. The least square means of body weight over all litters studied were 1.37kg at birth, 6.82kg at weaning.

3. The heritabilities of litter size at birth and weaning and body weight at birth and weaning were 0.454, 0.379, 0.009, 0.156, respectively.

4. Genetic correlation between litter size at birth and at weaning was 0.694, between body weight at birth and weaning was 0.294.

5. Phenotypic correlation between litter size at birth and at weaning was 0.794 and between body weight at birth and at weaning was 0.288.

6. Environmental correlation between litter size at birth and at weaning was 0.649, and between body weight at birth and at weaning was 0.294.

(Key words: heritabilities, genetic correlations, littersize, body weight)

I. 緒論

過去の主要な研究に加え、母猪と体重に対する形質を改良する目的で、遺伝的母猪に影響を与える要因を効果を推定するため、体質与

*畜産試験場 (Livestock Experiment Station)
Ⅱ. 材料 및 方法

1. 供試材料

本研究에 사용된材料는 仁川市에 위치한 슈완농장에서 1983년부터 1984년까지 2년간에 걸쳐 키우고
육된 Yorkshire, Landrace, Hampshire, Duroc 및 Crossbreed종소사 282頭에서 생산된
仔豚 2,794頭의
産仔數、離乳時生存数、生時體重、離乳時體
重에 대한 测定値이다.

2. 統計分析方法

一般能力의 推定 및 種豚豚의 分散成分을 얻기
위해서 Harvey (1970)의 方法에 의거 다음과 같은
Linear model에 根據하여 最少自乗法를 利用하여
実施하였다.

\[ Y_{ij} = u + a_i + b_j + d_{ij} \]

여기서 \( Y_{ij} \) 은 각 個體에 대한測定値이고, \( u \) 는
모든 個體의 共通의 等效요, \( a_i \) 는 \( i \) 번째 品種의 등
과, \( b_j \) 는 \( j \) 번째 産次의 等效요, \( d_{ij} \) 는 각 個體의 特有한
random error의 合計이다.

遺傳力 및 遺傳相關、環境相關 및 表現型相關의
推定은 Becker (1975)와 Van Vleck (1979)의 方法에
 따라 다음과 같이 計算하였다.

\[ h^2 = \frac{\text{\( \delta^2 \) (s:b)}}{\text{\( \delta^2 \) (e)}} \]

\[ r(g) \text{xy} = \frac{\text{\( \delta \) (s:b)xy}}{\text{\( \delta (s:b) \) x \( \delta (s:b) \) y}} \]

\[ r(e) \text{xy} = \left( \frac{\text{\( \delta \) (e)xy - 3\( \delta \) (s:b)xy}}{\text{\( \delta (e)x - 3\( \delta \) (s:b)x}} \right) \left( \frac{\text{\( \delta \) (e)y - 3\( \delta \) (s:b)y}}{\text{\( \delta (e)y - 3\( \delta \) (s:b)y)}} \right) \]

Table 1. Least square means and standard errors for litter size and body weight at birth
and at weaning

<table>
<thead>
<tr>
<th>Breed</th>
<th>Classification</th>
<th>Litter size</th>
<th>Body weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>At birth</td>
<td>At 30 days</td>
</tr>
<tr>
<td>Overall mean</td>
<td></td>
<td>9.86±0.13</td>
<td>8.57±0.13</td>
</tr>
<tr>
<td>Hampshire</td>
<td></td>
<td>8.68±0.47</td>
<td>6.84±0.44</td>
</tr>
<tr>
<td>Yorkshire</td>
<td></td>
<td>9.96±0.27</td>
<td>8.89±0.26</td>
</tr>
<tr>
<td>Landrace</td>
<td></td>
<td>9.04±0.49</td>
<td>8.31±0.42</td>
</tr>
<tr>
<td>Duroc</td>
<td></td>
<td>8.26±0.39</td>
<td>7.26±0.38</td>
</tr>
<tr>
<td>Crossbreed</td>
<td></td>
<td>10.44±0.16</td>
<td>8.98±0.16</td>
</tr>
</tbody>
</table>