Use of a Bio-Economic Model to Assess the Financial Impact of Changes in Breeding Herd and Growing Pig Performance

Dale Polson
B/NOBL LABORATORIES, Inc.
Saux Center, Iowa U.S.A.

Objective:

* Use bio-economic models to assist with evaluating the costs of substandard performance in the... 
...breeding herd 
...growing pig herd

Materials and Methods:

* Two bio-economic models were developed using a commercial spreadsheet (Lotus 1-2-3).

* For the breeding herd model, the MOVC method (margin-over-variable-cost) is used to calculate financial differences between two model herds.

* For the growing pig herd, financial output between two model herds is reported as the difference in total net profit per 1000 head facility per turn.

Materials and Methods:

* Breeding herd inputs:
  - weaning-to-first service interval
  - service-to-nonfarrowing interval
  - gestation length
  - lactation length
  - farrowing rate
  - liveborn per litter
  - percent preweaning mortality
  - percent post-weaning mortality
  - MOVC per pig sold

* Breeding herd outputs:
  - pigs weaned per mated female day
  - pigs weaned per mated female per year
  - pigs sold per mated female per year
  - MOVC per mated female per year

Materials and Methods:

* Breeding herd baseline assumptions:
  - 10.0 liveborn per litter
  - 12% preweaning mortality
  - 5% post-weaning mortality
  - 7 day weaning-to-service interval
  - 115 day gestation length
  - 21 day lactation length
  - 65 day service-to-nonfarrowing interval
  - 80% farrowing rate

Materials and Methods:

* Breeding herd comparison values:
  - 0.1 pig per litter born alive
  - 1.0% farrowing rate
  - 1.0% preweaning mortality
  - 1.0 day weaning-to-service interval
  - 1.0 day service-to-detect open interval

Table 1: Change in Pigs Weaned per Mated Female per Year Following a Change in Each Input Variable.

<table>
<thead>
<tr>
<th>Input Variable</th>
<th>Baseline PW/MFY</th>
<th>Adjusted PW/MFY</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 1% Farrow Rate</td>
<td>19.320</td>
<td>19.488</td>
<td>+ 0.168</td>
</tr>
<tr>
<td>+ 0.1 Liveborn/Litter</td>
<td>19.320</td>
<td>19.514</td>
<td>+ 0.193</td>
</tr>
<tr>
<td>- 1% Prewean Mortality</td>
<td>19.320</td>
<td>19.940</td>
<td>+ 0.220</td>
</tr>
<tr>
<td>- 1 Day Win -&gt; 1st Serve</td>
<td>19.320</td>
<td>19.467</td>
<td>+ 0.146</td>
</tr>
<tr>
<td>- 1 Day Lactation Length</td>
<td>19.320</td>
<td>19.467</td>
<td>+ 0.146</td>
</tr>
<tr>
<td>- 1 Day Serve -&gt; NonFarrow</td>
<td>19.320</td>
<td>19.349</td>
<td>+ 0.029</td>
</tr>
</tbody>
</table>

Figure 1: Relative Opportunity Cost per Mated Female per Year of Changes in Farrowing Rate and/or Liveborn per Litter
Use of a Bio-Economic Model to Assess the Financial Impact of Changes in Breeding Herd and Growing Pig Performance

Dale Polson
B/NOBL LABORATORIES, Inc.
Sauk Centre, Iowa U.S.A.

Materials and Methods:

* Growing pig herd outputs:
  -- revenue
  -- pig costs (raw material)
  -- fixed costs
  -- feed costs
  -- non-feed variable costs
  -- throughput (margin-over-pig costs)
  -- operating expense
  -- net profit (margin-over-all costs)

(Reported per 1000 head spaces, per pig sold)

Materials and Methods:

* Growing pig herd baseline assumptions:
  - 1,000 head facility
  - $45 pig cost at 22 kg
  - $92.40 or $105.60 market price per 100 kg
  - $164.66 feed cost per 1000 kg
  - 3.0 feed conversion ratio
  - 727 g average daily gain
  - 130 days-on-feed
  - 3 down days per turn (2.74 turns/year)
  - $0.80 routine health cost per pig
  - $1.00 special health cost per pig
  - 3.0% mortality
  - 3.0% culls

Materials and Methods:

* Growing pig herd comparison values:
  - 0.10 average daily gain (ADG)
  - 0.10 feed conversion ratio (FCR)
  - 1.0% mortality
  - 1.0% culls
  - 50% treatments
Questions?

Conclusions:

* Bio-economic models can be used to estimate the opportunity costs of substandard performance in the breeding and growing pig herds.

* All input changes examined play a meaningful financial role in the profit potential of pig farms.

* These opportunity cost estimates can serve as a starting point for considering the possible benefit:cost of intervention strategies under management consideration.