Use of genetic markers to reduce boar taint in Canadian pigs

Validation in commercial trials – preliminary results

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Boar taint can occur in meat produced from entire male pigs. It is caused by concentrations of androstenone and/or skatole in fat tissues higher than specific levels. The objective of this study was to investigate the possibility of reducing the amount of androstenone and skatole in fat tissues of intact males using genetic markers. Commercial trials were designed in Quebec and Manitoba in 2015 and 2016 in order to compare progeny of Duroc boars pre-selected on their breeding value for boar taint based on specific DNA markers.

Preliminary results show sex differences consistent with past research.
- Some trends can be seen between sire groups (high and low genetic potential for boar taint) but differences are not significant.
- Environmental effects appear to be large, with significant trial effects and room effects within the same barn.
- Further data analysis is required, especially using individual sire information, as well as new genotype data collected on crossbred progeny.
- There are many more traits to be analyzed, including carcass and meat quality traits and sensory evaluation data.
- Additional research is also planned using a new, larger set of SNP markers specific to boar taint.

**Context**

Table 1 - Sex differences

<table>
<thead>
<tr>
<th>Trait</th>
<th>N</th>
<th>F</th>
<th>C</th>
<th>IC</th>
<th>M</th>
<th>Signif</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Daily Gain (g/day)</td>
<td>617</td>
<td>1028a</td>
<td>1041d</td>
<td>1149d</td>
<td>1085e</td>
<td></td>
</tr>
<tr>
<td>Feed Conversion Ratio (kg/g)</td>
<td>622</td>
<td>2.50c</td>
<td>2.70c</td>
<td>2.54c</td>
<td>2.45c</td>
<td></td>
</tr>
<tr>
<td>Backfat (mm)</td>
<td>620</td>
<td>8.25d</td>
<td>7.90d</td>
<td>9.50d</td>
<td>8.15d</td>
<td></td>
</tr>
<tr>
<td>Lean depth (mm)</td>
<td>620</td>
<td>90.4c</td>
<td>89.0c</td>
<td>91.0c</td>
<td>90.5c</td>
<td></td>
</tr>
<tr>
<td>Carcass weight (kg)</td>
<td>619</td>
<td>105.7d</td>
<td>104.3d</td>
<td>102.4d</td>
<td>104.9d</td>
<td></td>
</tr>
<tr>
<td>Daily Dressing Yield (%)</td>
<td>616</td>
<td>89.1a</td>
<td>81.5a</td>
<td>79.9a</td>
<td>81.3a</td>
<td></td>
</tr>
<tr>
<td>Androstenone (ug/g) (log scale)</td>
<td>608</td>
<td>2.161a</td>
<td>2.21a</td>
<td>2.19a</td>
<td>2.19a</td>
<td></td>
</tr>
<tr>
<td>Skatole (ug/g) (log scale)</td>
<td>608</td>
<td>1.99a</td>
<td>2.11a</td>
<td>2.13a</td>
<td>2.15a</td>
<td></td>
</tr>
</tbody>
</table>

**Commercial Trial Design**

- 697 Duroc boars genotyped for 103 SNP markers identified at University of Guelph
- Marker-assisted genetic evaluation for androstenone (AND) and skatole (SKA)
- Top and bottom 15% boars on AND breeding values selected for commercial trials
- Production of 1,000 commercial pigs (males, females, castrates, immunocastrates) in three commercial trials
  - 2 trials in Quebec (CDPQ Deschambault station)
  - 1 trial in Manitoba (HyLife Highlander test barn)

**Conclusions**

**Acknowledgements**

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