DENMARK’S NEW GOAL FOR SOW PRODUCTIVITY 40 PIGS PER SOW AND YEAR

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ASAS China
October 20th, 2016
FLEMMING THORUP
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- SEGES: 1985 to 2016
- 一般繁殖 General reproduction
  - 人工授精 Artificial insemination
  - 产仔数 Litter size
  - 夭折 Abortion
  - 妊娠诊断 Pregnancy diagnosis
- 繁殖传染病 Infectious diseases in reproduction
- 仔猪死亡率 Piglet mortality
  - 产仔 Farrowing
  - 哺乳期 Lactation
  - 较高的断奶体重 High weaning weight
IT ALL STARTED IN CHINA 40 YEARS AGO
始于40年前的中国

The famous Meishan pig  著名的梅山猪

- Prolific: 16-18 piglets per litter 高产：每窝16-18头仔猪
- Good mothering ability  母性好
- Superior piglet survival  高活仔
- Can digest roughage  耐粗饲

- Fat piglets 仔猪肥
- Slow growing 长速慢
- Low but uniform birth weight 出生重低却均匀
EVERYONE WANTED MEISHAN GENES OR PROLIFIC SOWS
梅山基因和高产母猪受热捧

- Crossing Landrace with Meishan 长白猪和梅山猪交配
- Genetic engineering 基因工程
- Selection for specific prolific genes (Borola gene) 筛选特定高产基因（Borola 基因）
- Selection for estrogen genes 筛选母性基因
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Very high health status

250 km

Loose housing in gestation

Farrowing crates are still accepted

Family owned production

家族产业
母猪年断奶仔猪数
WEANED PIGLETS PER SOW AND YEAR

- Litters per year \times \text{weaned pigs per litter}
- Litters per year 年产窝数
  - No weaning before 21 days (EU regulation and good science)
    21天之前不断奶（基于欧盟法规和科学的方法）
  - High farrowing rate => few empty days
    分娩率高 => 空怀期短
  - Danish average = 2.27 litters per sow and year
    丹麦平均每头母猪每年2.27窝

- Weaned piglets per litter 窝断奶仔猪数
  - Many total born piglets 总产仔数增加
  - Few still born piglets 死胎少
  - Low piglet mortality 仔猪死亡率低
  - Danish average = 13.8 piglets weaned
    丹麦平均窝断奶仔猪数13.8
WHERE IS DENMARK NOW?
丹麦目前的养猪生产在什么水平？

- The average producer 一般的养猪生产者
  - Produces 31.4 pigs per sow per year 平均每头母猪每年提供生猪31.4头
  - Farrow 15.9 live born piglets per litter 窝产活仔数15.9
  - Weaning 13.8 piglets per litter 窝断奶仔猪数13.8
  - Daily gain in weaners is 444 gram per day 断奶仔猪日增重444克/天
  - 育肥猪日增重974克/天 Daily gain in finishers is 947 gram per day

- The best 5 producers in Denmark 丹麦前五位养猪生产者
  - Produces 36.9 pigs per sow per year 平均每头母猪每年提供生猪36.9头
  - Farrows 17.2 live born piglets per litter 窝产活仔数17.2
  - Weaning 15.7 piglets per litter 窝断奶仔猪数15.7
  - Daily gain in weaners is 496 gram per day 断奶仔猪日增重496克/天
  - 育肥猪日增重1.077千克/天 Daily gain in finishers is 1.077 kg per day

Every year Danish pig producers are weaning 0.7 piglets more per sow and year
丹麦养猪生产者每头母猪每年多提供0.7头断奶仔猪。
THE NEED TO HANDLE LARGE LITTERS

管理高窝产母猪的必要性

THORUP. 20,000 LITTERS BORN IN 2012

2012年20,000窝数据总结

Live born piglets

窝产活仔数

% of litters

窝产仔数分布

Total born (live and still born) piglets in the litter

总产仔数（活仔+死胎）
CHALLENGES WITH LARGE LITTERS

- Colostrum 初乳
- Milk production 产奶量
- Space 哺乳空间
LITTER GROWTH PER DAY

T. S. BRUUN

No. piglets weaned vs. litter growth per day (kg)

Kilde: Erfaring nr 1316
COLOSTRUM = THE FIRST MILK
初乳 = 第一口奶

- Colostrum is available contineously during farrowing 初乳可以在分娩过程中持续产生
- Maternal antibodies = Immuno Globuline G 母源抗体 = 免疫球蛋白IgG
  - 25 ml colostrum per piglet is sufficient 每头仔猪25ml的初乳就足够了
- Energy 能量
  - 200 ml colostrum/kg piglet/day is needed for survival 每头仔猪每公斤体重每天需要200ml初乳才能满足存活的能量需要
Immuno-globulin uptake in 450 piglets

450头仔猪的免疫球蛋白摄入量数据

Piglet number

Wedel Müller, 2011.
FEEDING IN LACTATION IS IMPORTANT

哺乳期采食饲料非常重要

- High litter size = high milk output 高窝产仔数 = 高产奶量
- Average litter growth is 3 kg/day 日均窝增重为3kg/天
- Slowly increasing feed allowance 逐渐增加饲料的供给
- Maximum 9 kg/day 最大量9kg/天
- Optimal feed quality 最佳的饲料供给量
- Focus on protein and Lysine 重点考虑蛋白和赖氨酸
- Remember water 注意水的供给
SPLIT NURSING FOR COLOSTRUM, 12 SMALL PIGLETS AT THE SOW FOR 1 HOUR; LARGE PIGLETS IN ENCLOSURE.

为了额外供给初乳，将大的仔猪隔开，给12头小仔猪单独与母猪放在一起1个小时。
<table>
<thead>
<tr>
<th></th>
<th>11 piglets</th>
<th>13 piglets</th>
<th>15 piglets</th>
</tr>
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<tbody>
<tr>
<td>Runt piglets taken away, %</td>
<td>8</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>淘汰的僵猪，%</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Mortality, %</td>
<td>5</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>死亡率，%</td>
<td></td>
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<tr>
<td>Weaned from own sow, no.</td>
<td>9.6</td>
<td>10.9</td>
<td>11.7</td>
</tr>
<tr>
<td>分娩母猪断奶仔猪数量，头</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weaned, %</td>
<td>87</td>
<td>84</td>
<td>78</td>
</tr>
<tr>
<td>断奶率，%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight at weaning, kg</td>
<td>7.9</td>
<td>7.5</td>
<td>7.2</td>
</tr>
<tr>
<td>断奶重，kg</td>
<td></td>
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</tbody>
</table>
LACTATION 哺乳期

- The sow nurses every 40 minutes
  母猪每40分钟一次泌乳反射
- Each nursing last for 5-10 seconds
  每次泌乳反射持续5-10秒
- All piglets must be present at nursing
  泌乳反射期间所有仔猪必须在场
- How to handle the many piglets born?
  如何处理高窝产时的情况？
ADJUSTING LITTER SIZE

- When farrowing is over 在分娩结束时
- When the piglets has had enough colostrum 在仔猪摄入足够初乳时
- 12 hours after birth 出生后12小时
- Before the piglets starve to death 在饥饿致死之前
- Before 24 hours after birth 出生后24小时之前
- Before nursing rank has been established 在哺乳序列建立之前
- Before 48 hours after farrowing 分娩后48小时之前
- Before unused teats dry out 在未用乳头断乳之前
- Before 48 hours 48小时之前
- Right number of piglets at the sow 确保母猪所哺仔猪数量合适
- The number of functional glands 有效乳腺的数量
- Maximum 14-16 最多14-16个
- Right piglets at each sow 每头母猪所分配的仔猪数量合适
- Small piglets at young sows 年轻母猪照顾弱小仔猪
- Smallest at 2nd parity sows (Immunoglobulins, milk production) 二胎母猪照顾最弱小仔猪（免疫球蛋白，产奶量）
- Large piglets at old sows 老龄母猪照顾强壮仔猪
NURSE FOR SMALL PIGLETS

弱仔猪的管理

Sows with some small newborn piglets in the litter

母猪每窝都有些体重小的新生仔猪

IGG 免疫球蛋白 G

12 hours after farrowing

分娩后12小时

The largest piglets are taken to other sows

最强壮的仔猪分配给其他母猪

Newly farrowed sow with accessible nipples

拥有可用乳头的刚分娩的母猪
TWO STEP FOSTERING PROCESS

New born piglets

4-8 day old piglets

21 day old piglets

Remember 12 hours for colostrum intake

保证12小时的初乳摄入

Flemming Thorup, PRC
EXTRA MILK SUPPLY 人工乳的使用
LISBETH BROGAARD PETERSEN 2013
<table>
<thead>
<tr>
<th></th>
<th>15 piglets at the sow</th>
<th>Milk feeding</th>
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<tr>
<td></td>
<td>Thorup</td>
<td>Petersen</td>
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<tr>
<td>Number of litters 总窝数</td>
<td>87</td>
<td>40</td>
</tr>
<tr>
<td>Piglets per litter after adjustment</td>
<td>15</td>
<td>17.8</td>
</tr>
<tr>
<td>Number of weaned piglets per litter</td>
<td>12.5</td>
<td>15.1</td>
</tr>
<tr>
<td>Per cent weaned piglets per litter</td>
<td>83%</td>
<td>85%</td>
</tr>
</tbody>
</table>
SPLIT MILKING FOR SOWS MILK
AN ALTERNATIVE TO NURSE SOWS

- 6 sows did each manage 24 piglets
- The first 3 days 12 piglets were exchanged every 6 hours
- Then 18 days with exchange every 12 hours
- Extra milk supplement
- Extra dry feed
RESULTS 结果

- The sows did accept the two teams of piglets 😊 母猪接受两组不同的仔猪
- The piglets did keep the same rank when returned to the sow 😊 当再次换回到同一母猪时，仔猪能够保持相同的哺乳序列
- Exchange of litters did not affect the interval between nursings 😊 (Based on video from day 6 onwards) 各窝仔猪的交换哺乳不影响泌乳反射间隔（基于从6日龄起的视频得出此结论）
- Survival was acceptable. 92% 存活率是可以接受的：92% 😊
- Growth was unacceptable. 4.7 kg by day 21 😞 生长不太理想 4.7kg/21日龄
CONCLUSIONS

- Denmark will do 40 pigs/sow/year
- 2017 in the best herd
- In 10 years in average herds
- Conventional breeding increases litter size
- Piglets in large litters will survive
- Large litters = good management
- High litter size and high finisher growth rate
Thank you for your attention 谢谢!