

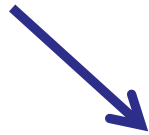
Developing a 5 tonne sow: Biologically possible or commercially probable?

G.A. Walling & E.F. Knol

Defining the 5 tonne sow



5,000kg of pig carcasses per sow



Current Levels Of Output From Elite Sows

Current Elite Sows

- **Assumptions**
 - Always hold to first service
 - No failed pregnancies
 - Never have prolonged weaning-service intervals
 - Culled immediately at final weaning
 - All pigs sold at full weight

Elite Sow: Cycle Length

- **Gestation** **114 days**
- **Lactation** **23 days**
- **Weaning-Service** **5 days**
- **Total** **142 days**

- **Litters/sow/year = $365/142 = 2.57$**

Elite Sow: Piglet Output

- **Total Born per litter** **18.2**
- **Live born per litter** **16.1**
- **Weaned per litter** **13.5**
 - **Pre-weaning mortality 16%**
- **Finished per litter** **12.8**
 - **Post-weaning mortality 5.2%**
- **Kilos sold per litter** **1,216kg**
 - **Carcase weight 95kg**

Current Elite Sow Output
2.57 x 1216kg = 3,125kg

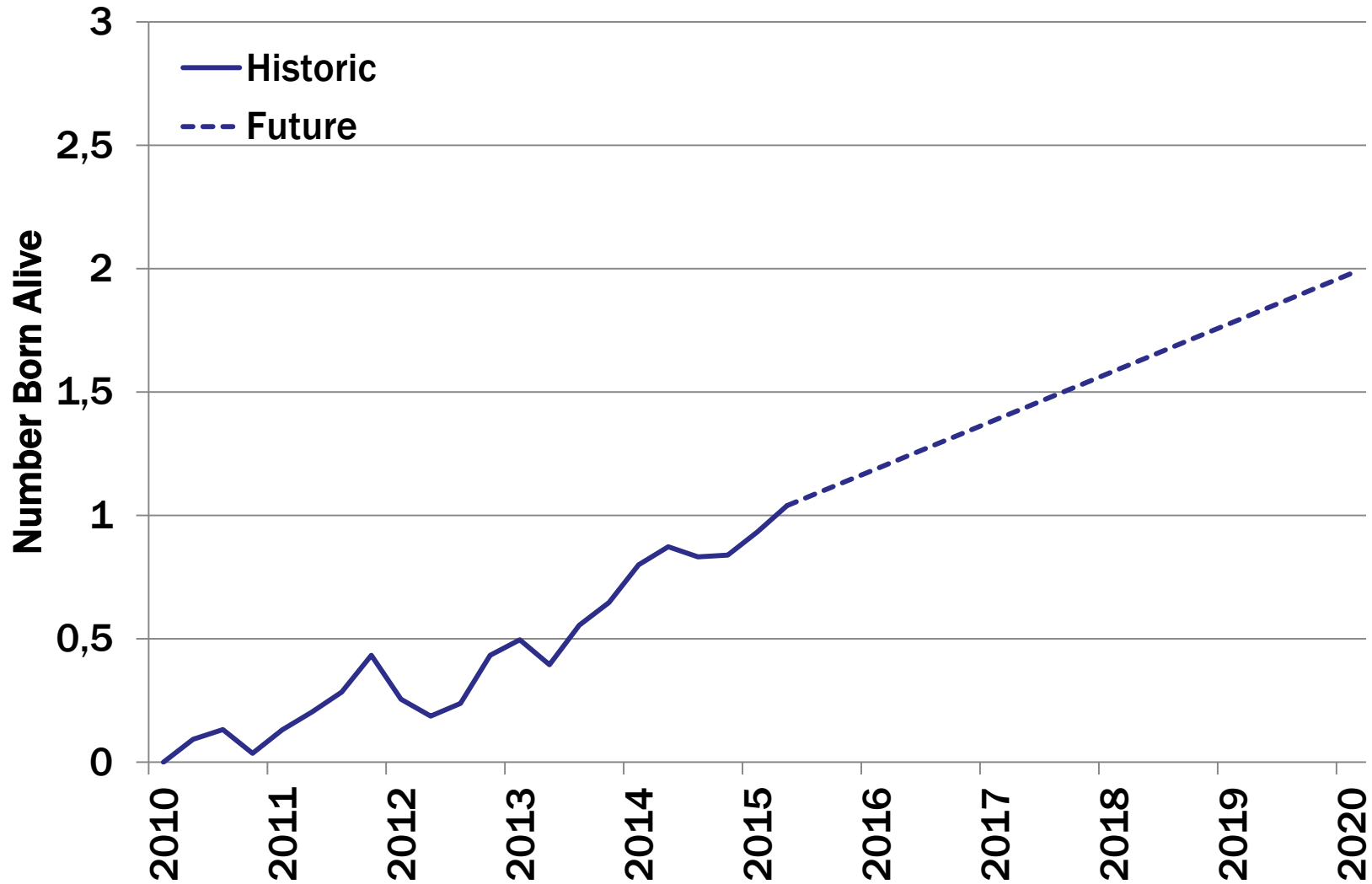


Towards the 5 tonne sow

Achieving the 5 tonne sow

1. Increase Litter Size

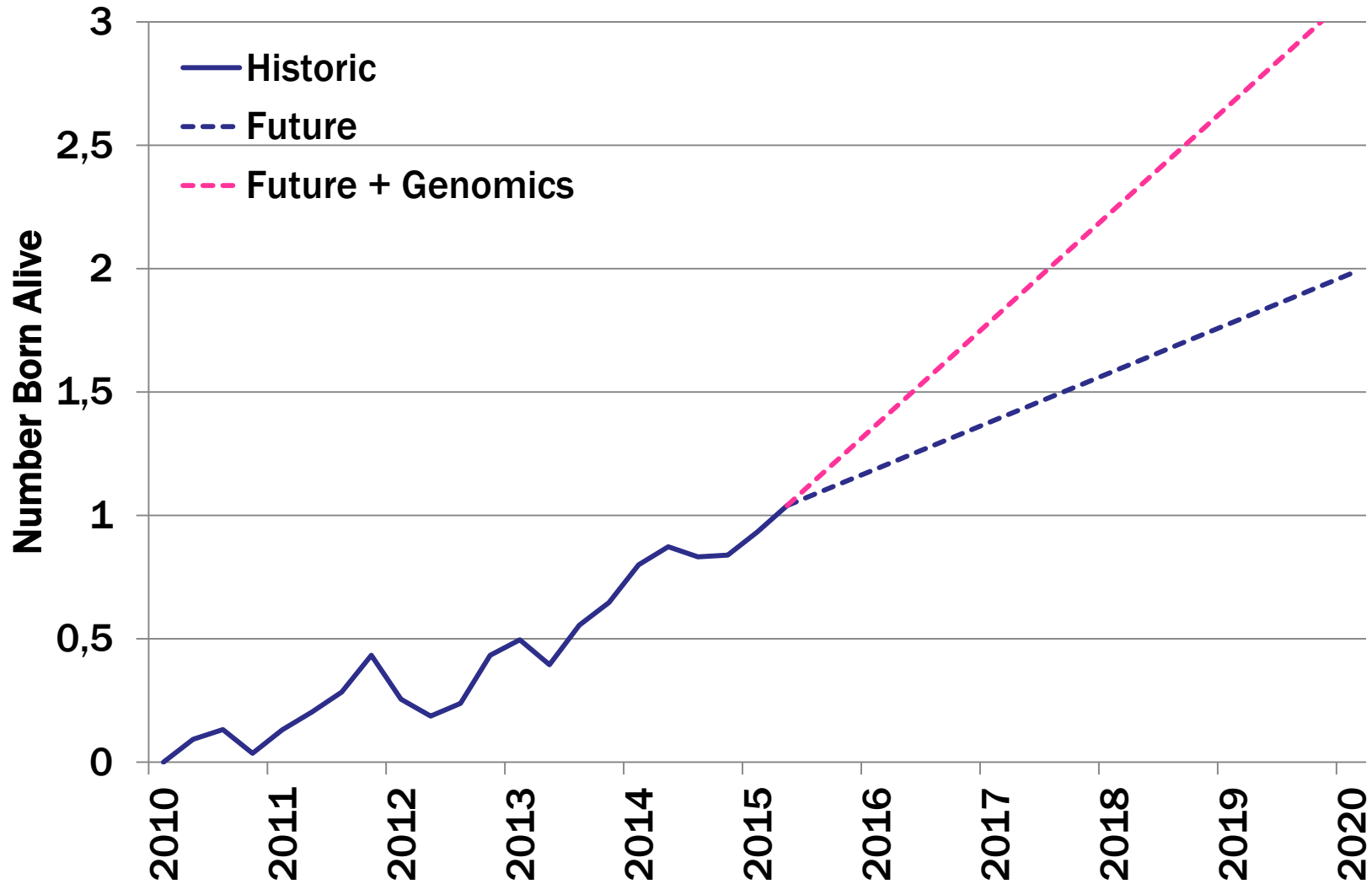
Genetic Trends: Numbers Born Alive



Genomics Benefits Litter Size Traits



Genetic Trends: Numbers Born Alive



Impact of Genetic Progress for Litter Size

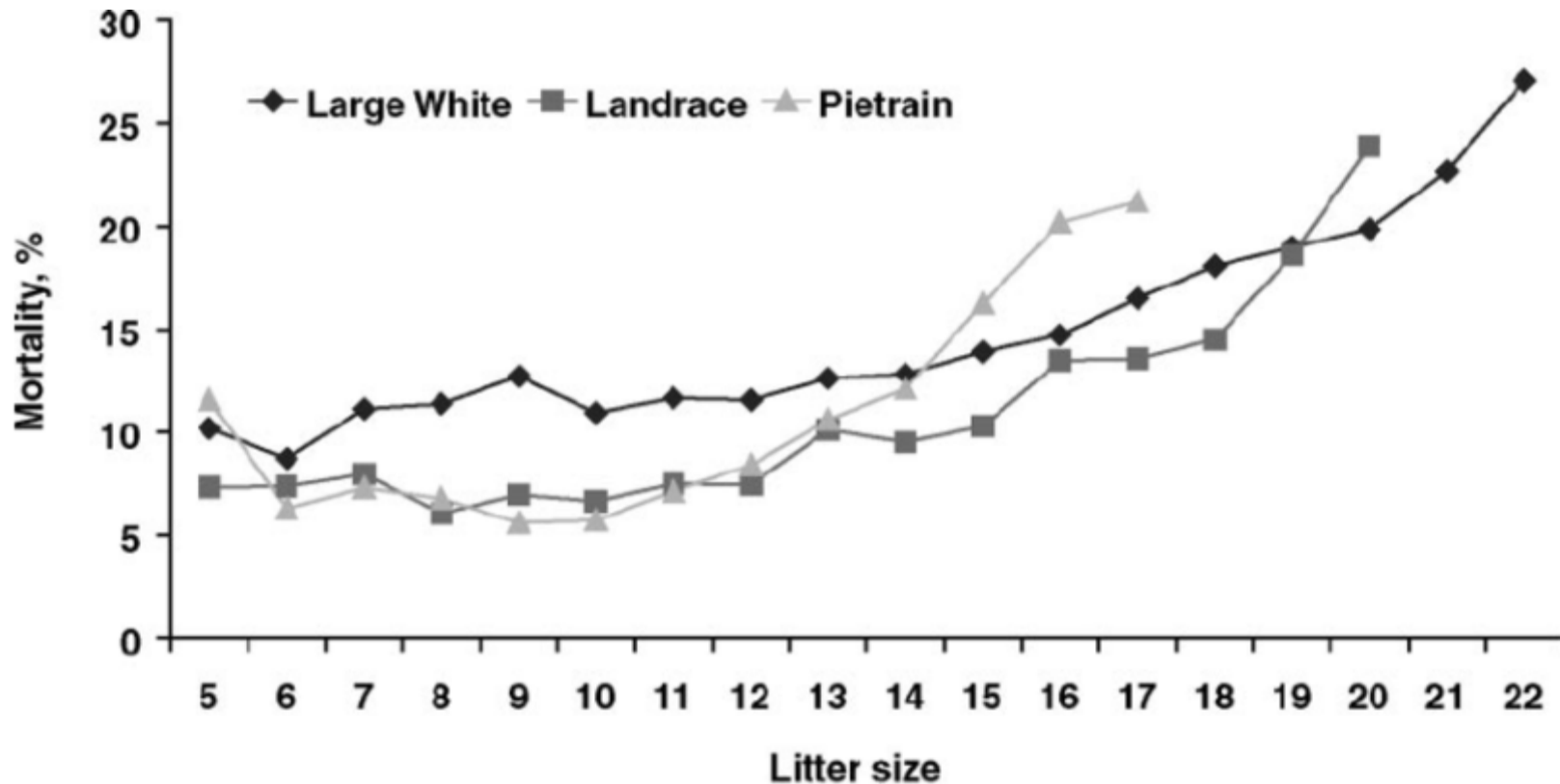
- **Total Born per litter** **18.2**
- **Live born per litter** **16.1 + 2**
- **Weaned per litter** **13.5 + 1.7**
 - **Pre-weaning mortality 16%**
- **Finished per litter** **12.8 + 1.6**
 - **Post-weaning mortality 5.2%**
- **Kilos sold per litter** **1,216 + 152kg**
 - **Carcase weight 95kg**

Elite Sow Output

$2.57 \times 1368\text{kg} = 3,516\text{kg} (+12.5\%)$

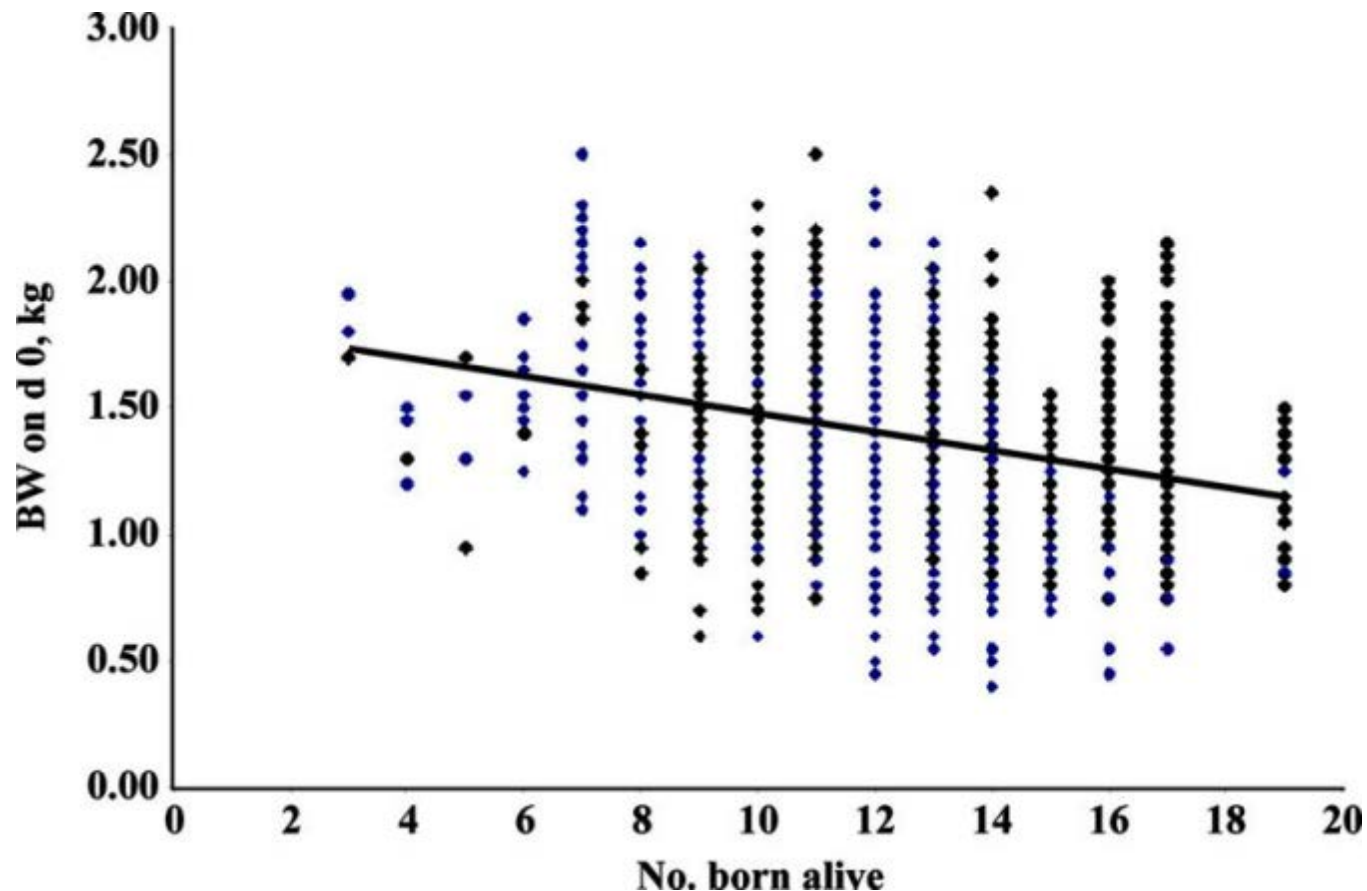


Mortality Increases In Larger Litters



From Ibanez et al. (2008) Journal of Animal Science 87(1):80-7

Larger Litters Produce Lighter Piglets



From Beaulieu *et al.* (2014) *Journal of Animal Science* 88(8):2767-2778

Lighter Piglets Have Increased Mortality.....

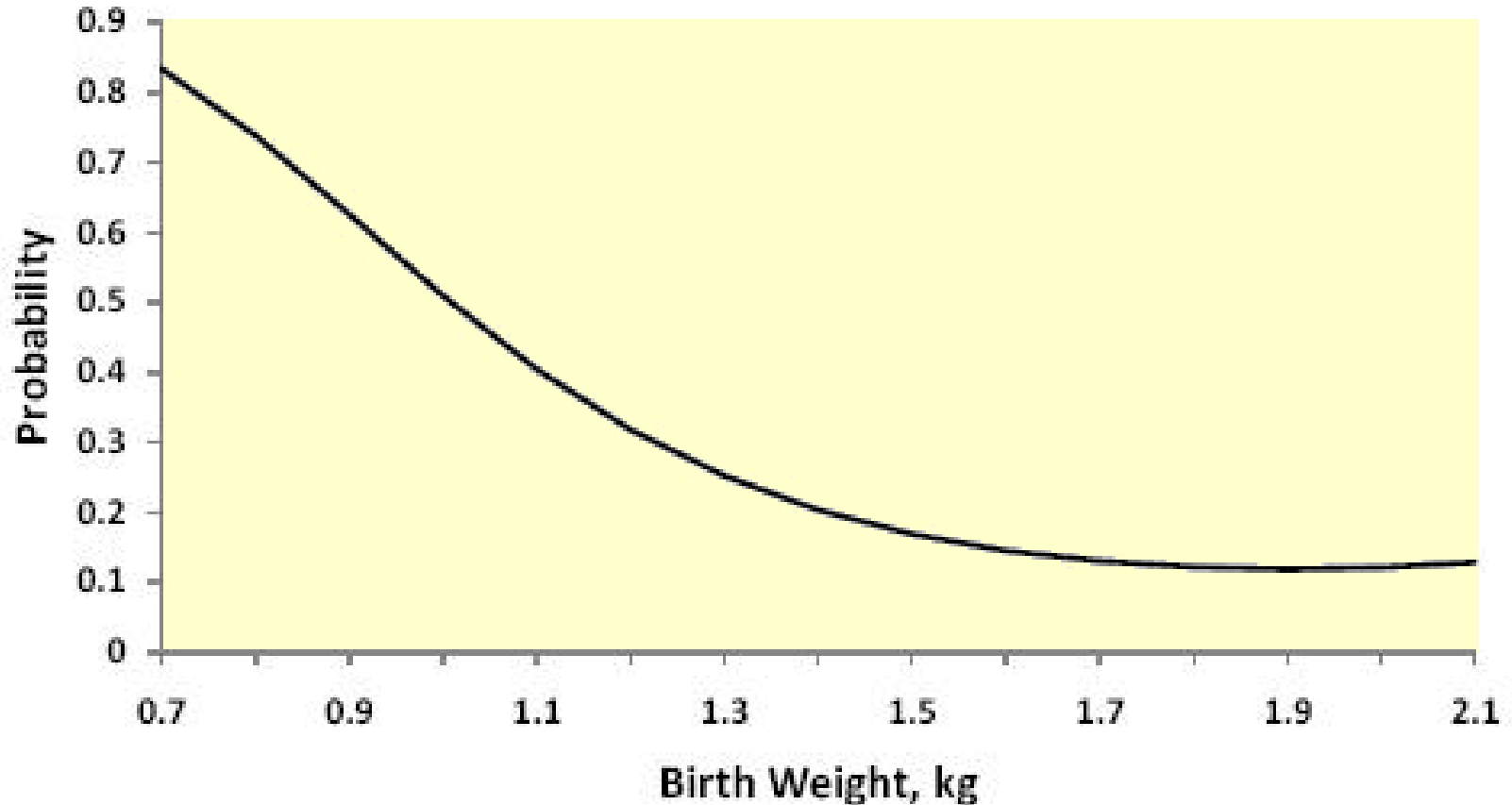
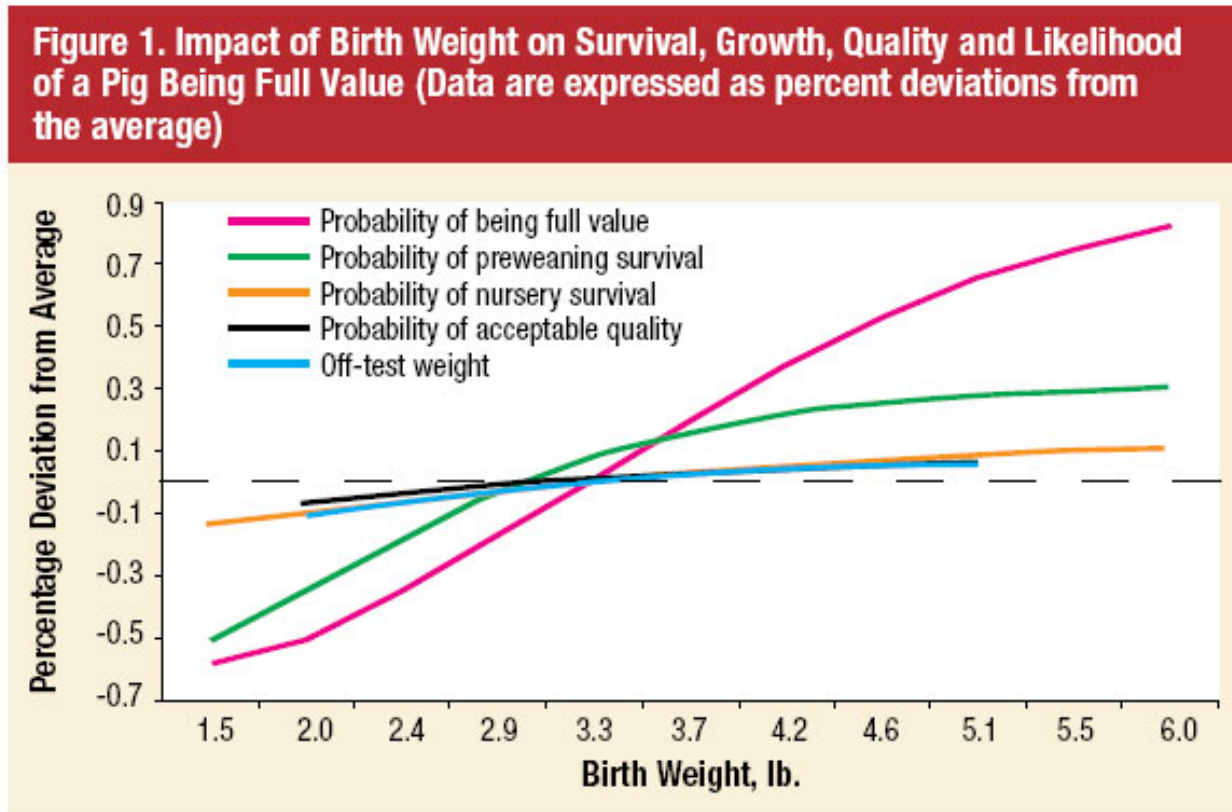


Image taken from <http://www.thepigsite.com/articles/2767/piglet-birth-weight-affects-future-growth-composition-and-mortality>

... and are less likely to make full value

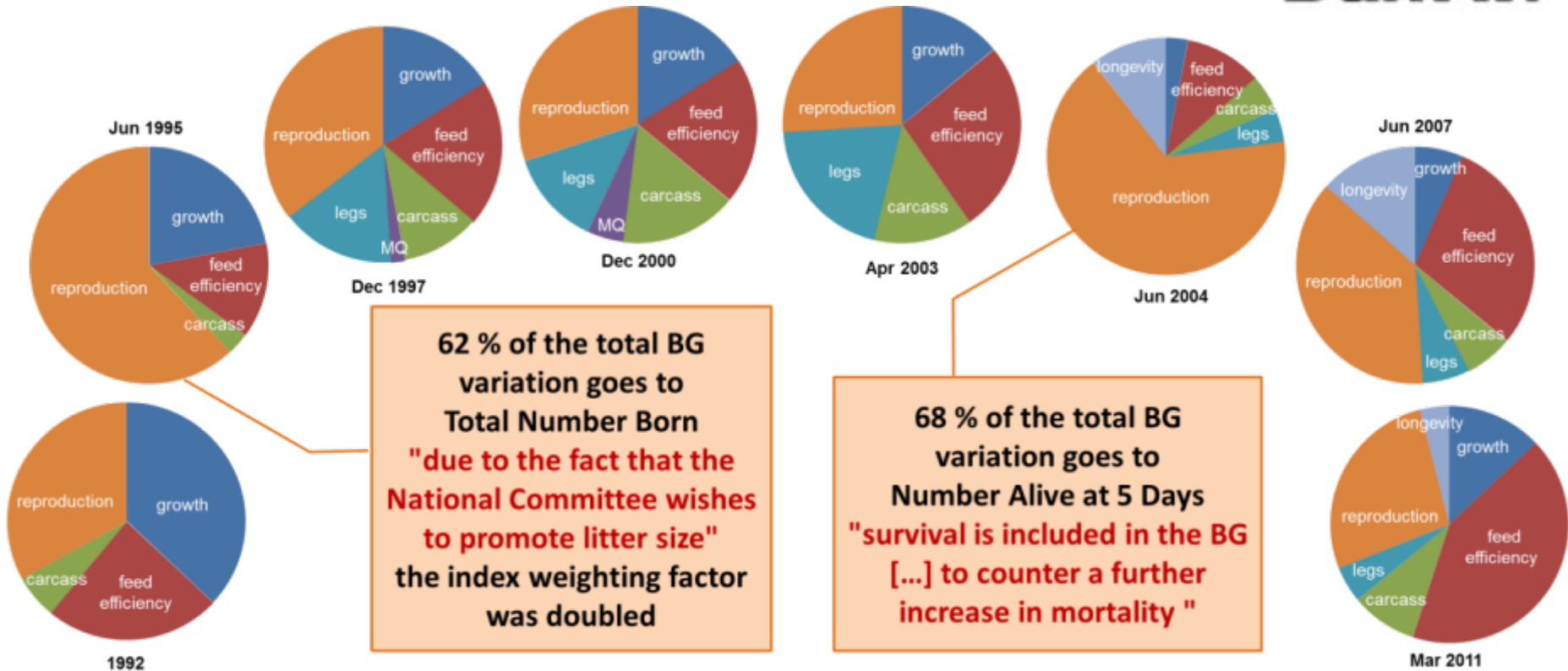


Research by Justin S. Fix and M. Todd See, North Carolina State University, Raleigh; Graph taken from nationalhogfarmer.com

Difficult to maintain with higher litter size

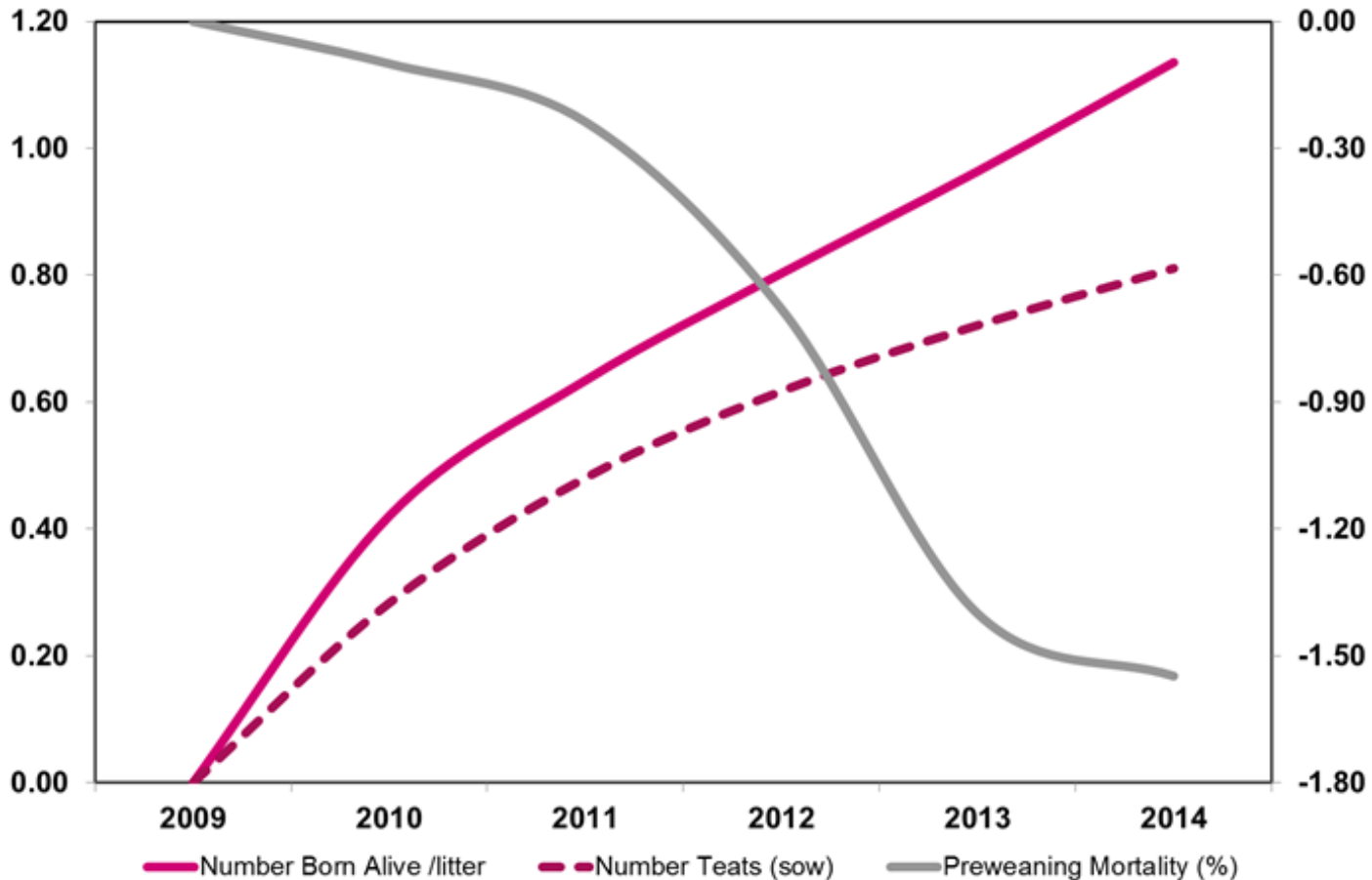
- Total Born per litter 18.2
- Live born per litter 16.1 + 2
- Weaned per litter 13.5 + 1.7
 - Pre-weaning mortality 16%
- Finished per litter 12.8 + 1.6
 - Post-weaning mortality 5.2%
- Kilos sold per litter 1,216 + 152kg
 - Carcase weight 95kg

Solution: More balanced selection



Slide kindly shared by Pieter Knap, PIC

Breeding Companies Including Piglet Survival Traits in Indices



Number born alive per litter and number of teats (left axis)
Pre-weaning mortality % (right axis)

More traits in index can reduce genetic progress for other existing traits

Achieving the 5 tonne sow

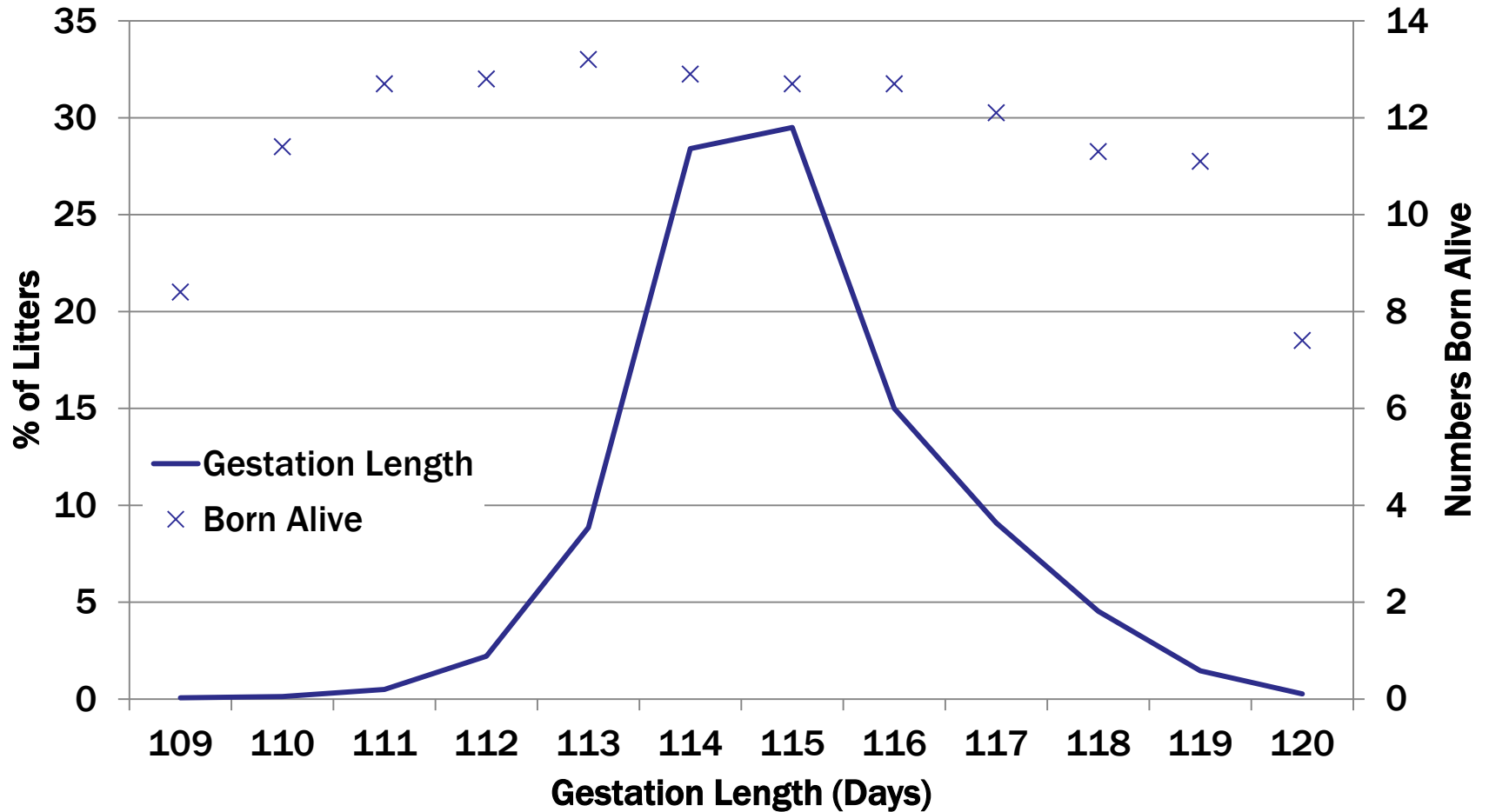
1. Increase Litter Size
2. Reduce Cycle Length

Elite Sow: Cycle Length

- **Gestation** **114 days**
 - **Lactation** **23 days**
 - **Weaning-Service** **5 days**
 - **Total** **142 days**
-
- **Litters/sow/year = $365/142 = 2.57$**

Variation between
sows and litters

Typical Distribution of Gestation Length



Elite Sow: Cycle Length

- **Gestation** **114 days**
- **Lactation** **23 days**
- **Weaning-Service** **5 days**
- **Total** **142 days**

Variation between
sows and litters

Legal minimum is
21 days not 23

Possible to reduce
by ~1 day

- **Litters/sow/year = $365/142 = 2.57$**

Elite Sow: Cycle Length

- Gestation 114 days -2 days
 - Lactation 23 days -2 days
 - Weaning-Service 5 days -1 day
 - Total 142 days -5 days
-
- Litters/sow/year = $365/137 = 2.66$

Elite Sow Output

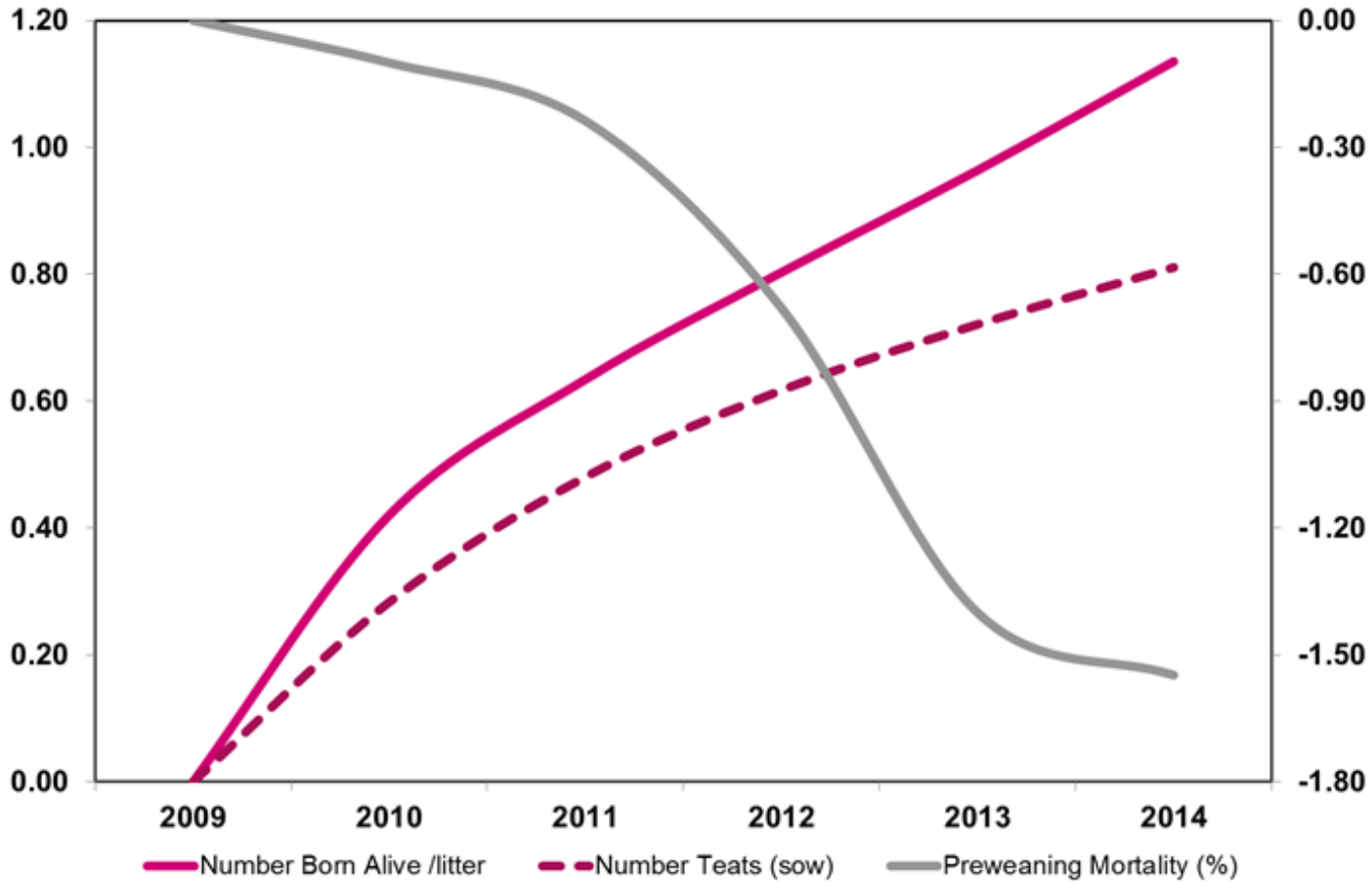
2.66 x 1368kg = 3,639kg (+3.5%)



Achieving the 5 tonne sow

1. Increase Litter Size
2. Reduce Cycle Length
3. **Reduce Mortality**

Possible to Genetically Reduce Mortality



Number born alive per litter and number of teats (left axis)
Pre-weaning mortality % (right axis)

Impact of Genetic Progress for Litter Size

- Total Born per litter 18.2
- Live born per litter 16.1 + 2
- Weaned per litter 13.5 + 1.7 + 0.3
 - Pre-weaning mortality 16% - 1.5%
- Finished per litter 12.8 + 1.6 + 0.4
 - Post-weaning mortality 5.2% - 0.5%
- Kilos sold per litter 1,216 + 152kg + 38kg
 - Carcase weight 95kg

Elite Sow Output

2.66 x 1406kg = 3,740kg (+2.8%)



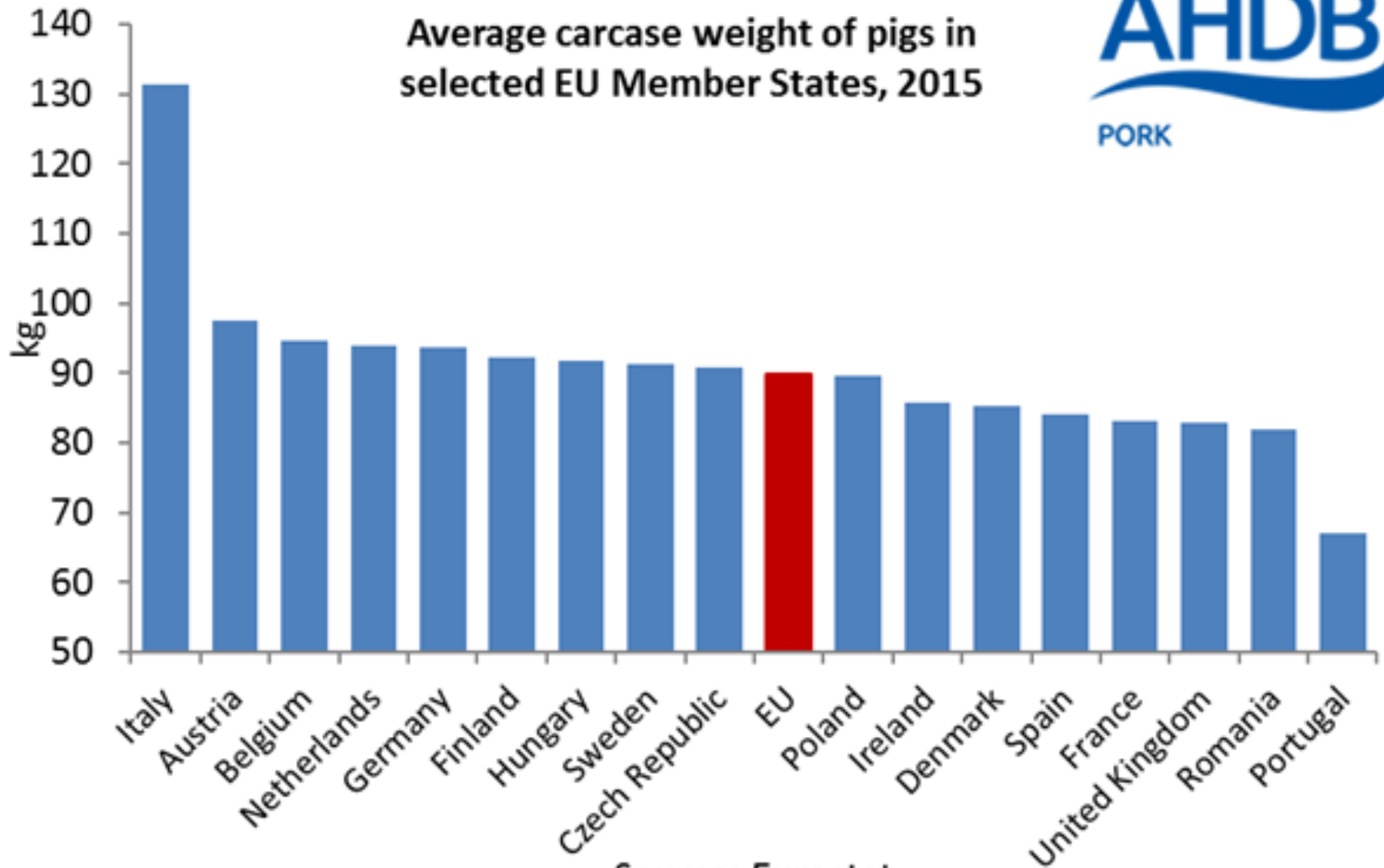
Still nowhere near a 5 tonne sow

Shortcut To The 5 Tonne Sow

Becoming Italian and Increasing Weight



Average carcass weight of pigs in selected EU Member States, 2015



Source: Eurostat

Impact of Genetic Progress for Litter Size

- Total Born per litter **18.2**
- Live born per litter **16.1 + 2**
- Weaned per litter **13.5 + 1.7 + 0.3**
 - Pre-weaning mortality **16% - 1.5%**
- Finished per litter **12.8 + 1.6 + 0.4**
 - Post-weaning mortality **5.2% - 0.5%**
- Kilos sold per litter **1,216 + 152kg**
+ 38kg + 539kg
 - Carcase weight **131.4kg**

Elite Sow Output

$2.66 \times 1945\text{kg} = 5,174\text{kg} (+38.3\%)$



Issues With This Approach

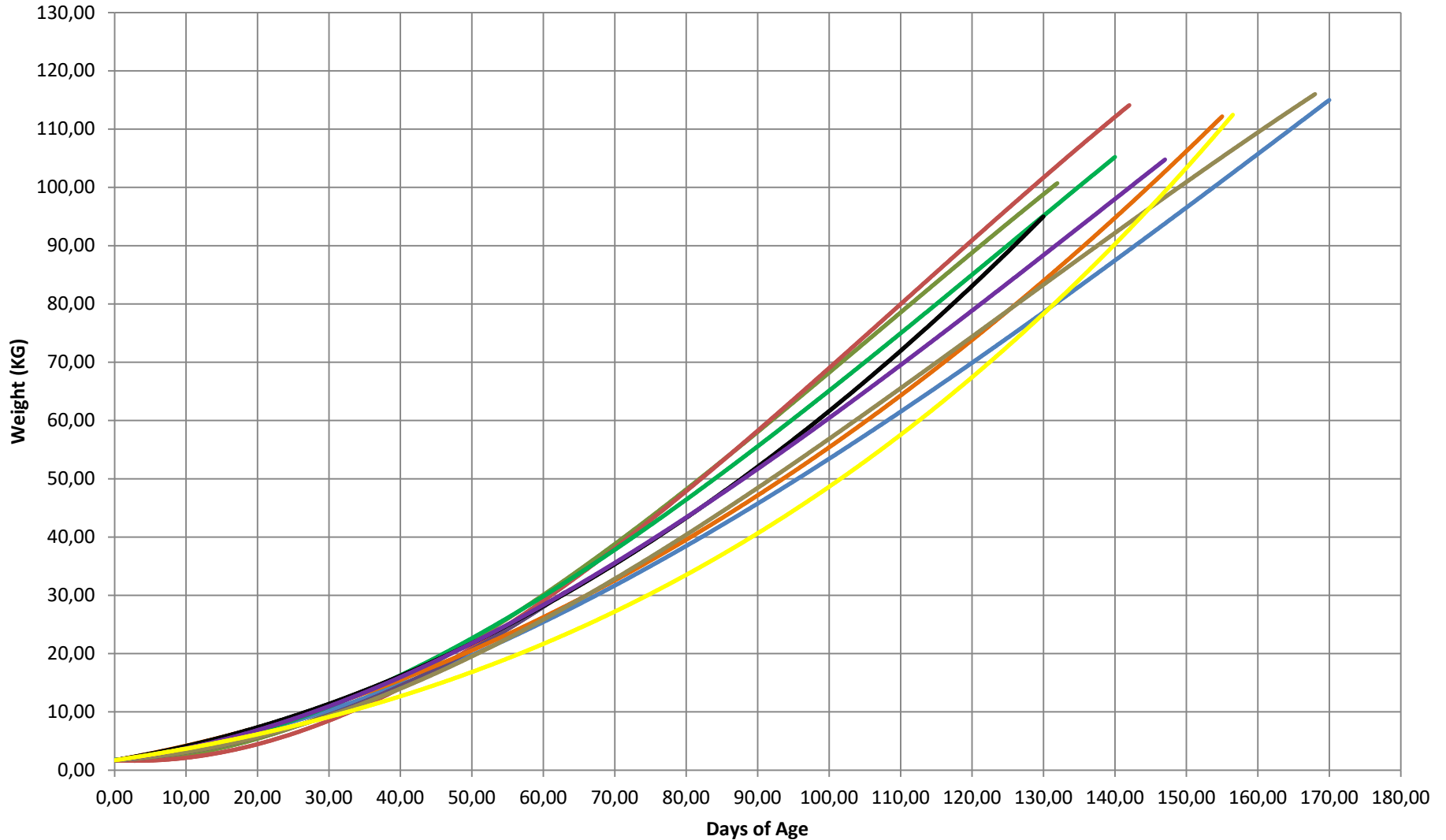
- **Consumer/Retail Demand**
 - **Pack & Portion size**

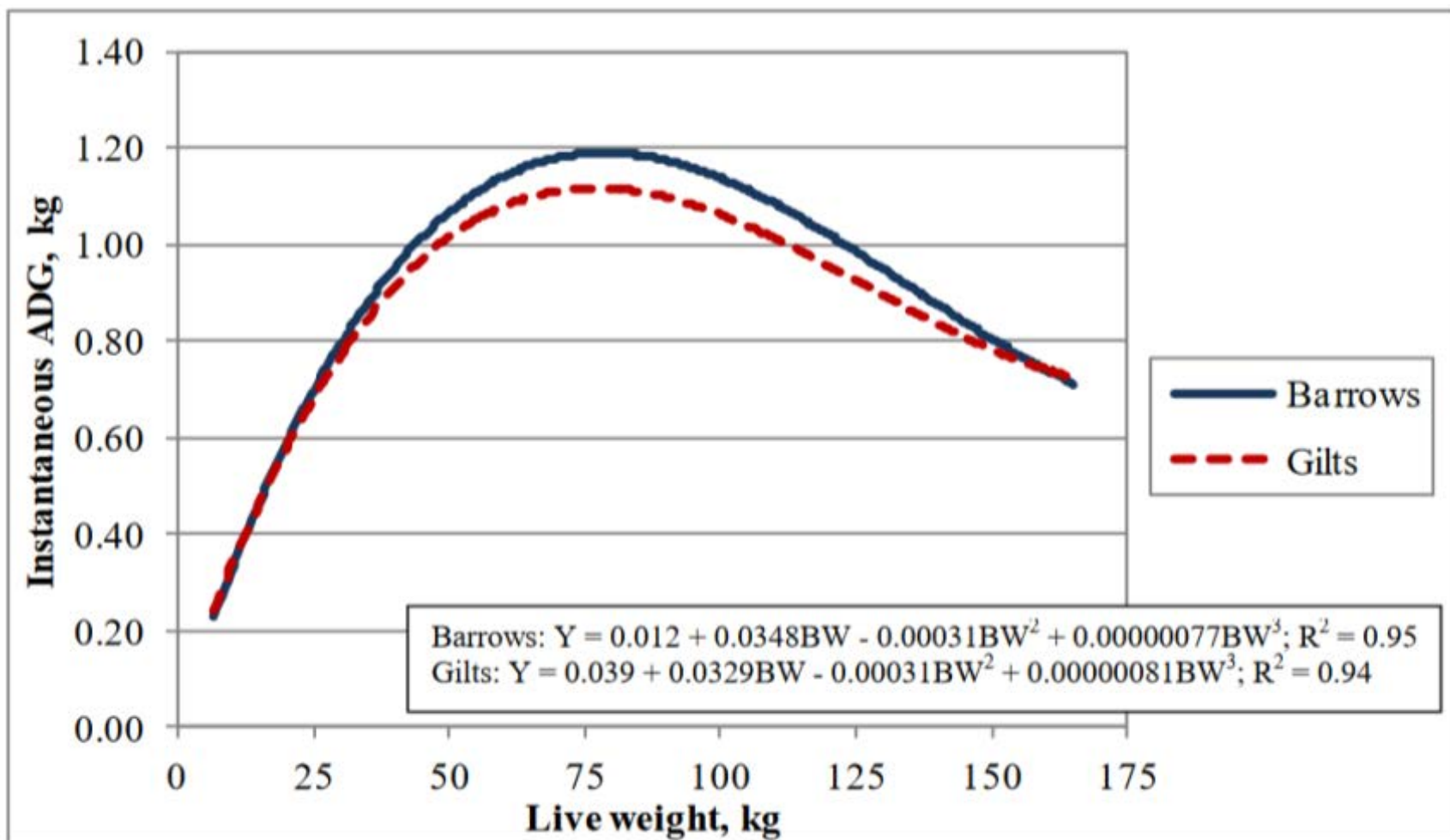


Issues With This Approach

- Consumer/Retail Demand
 - Pack & Portion size
- **Shape of the Growth Curve**

Customer Growth Curves





Taken from PhD Thesis of Shull (2013), University of Illinois

Issues With This Approach

- Consumer/Retail Demand
 - Pack & Portion size
- Shape of the Growth Curve
- **Boar Taint**

PigProgress - EU banning ... X +

www.pigprogress.net/Growing-Finishing/Environment/2010/12/EU-banning-piglet-castration-by-2018-PP006786W/

EU castration ban

login Register

Home Feed Poultry Dairy RBI Agri

Sows Piglets Finishers Digital Magazine

Growing / Finishing

News | Dec 16, 2010 | 6169 views | 1 comment

EU banning piglet castration by 2018

The European Union has taken another step into the abolishing of piglet castration. An agreement has been reached to stop castrating without anaesthesia by January 1, 2012 - and a total ban has been scheduled to be implemented by 2018 at the latest.

The announced deal is not so much part of European legislation as a voluntary agreement between market parties. The European Commission had initiated the talks, the European farmers organisation Copa-Cogeca, the European organisation for the meat sector UECBV, retailers, veterinarians, the European animal welfare organisation Eurogroup for Animals all joined in.

The deal was not officially confirmed as all relevant parties will have to submit the result to their members.

Netherlands: Product board happy

Frans van Dongen, negotiator on behalf of the Dutch Product Board for Livestock, Meat and Eggs (PVE), said he expects all parties involved will sign the deal around the abolishing of piglet castration - which will almost include all European pig production.

Some exceptions have been made as the heavy pig production in e.g. Italy for Parma production will be exempted from castration.

Most read news

5 reasons why weaning age will come down
John Gadd Aug 1

Farm producing pigs, data and knowledge
Vincent ter Beek Jul 29

Pig Progress 6: Why Big Data matter in pigs
Vincent ter Beek Aug 3

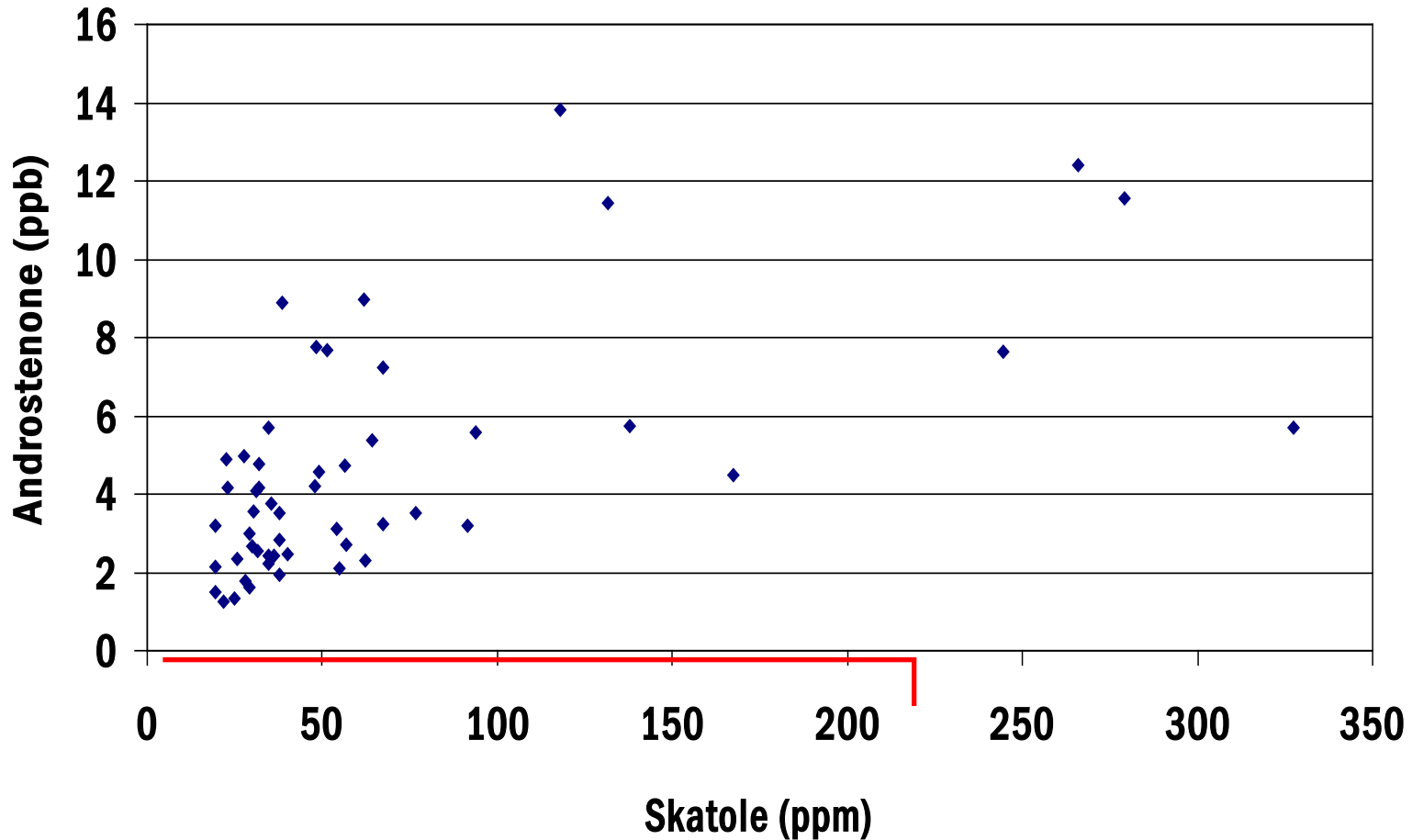
Coming soon: The gut health special edition
Contact our sales team for more information

Keeping swine profitable without AGPs
Selko feed additives support gut health

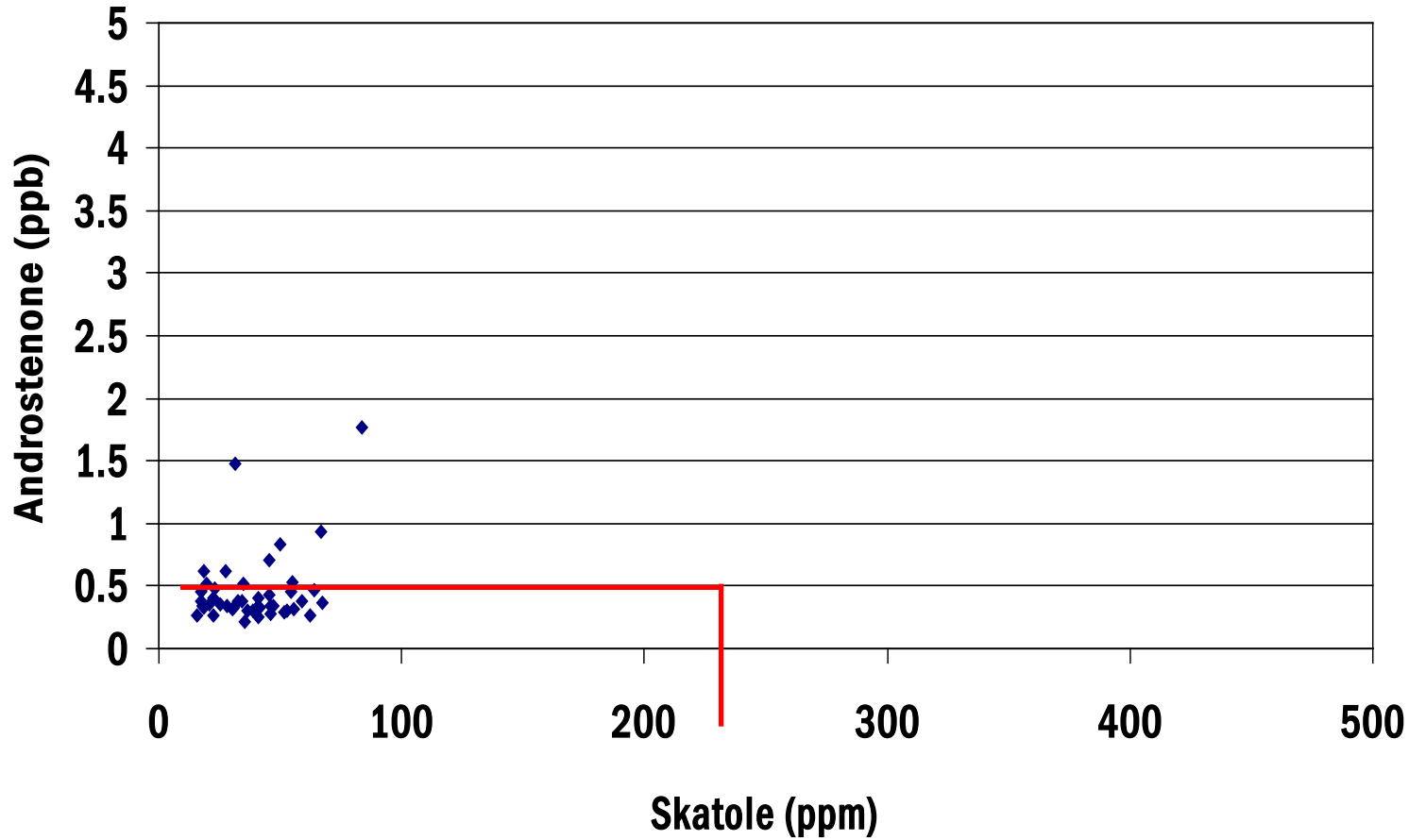
Pre-weaning nutrition:
How a little means a lot..

logolinks.reedbusiness.nl/click.aspx?id=128358&id=14753

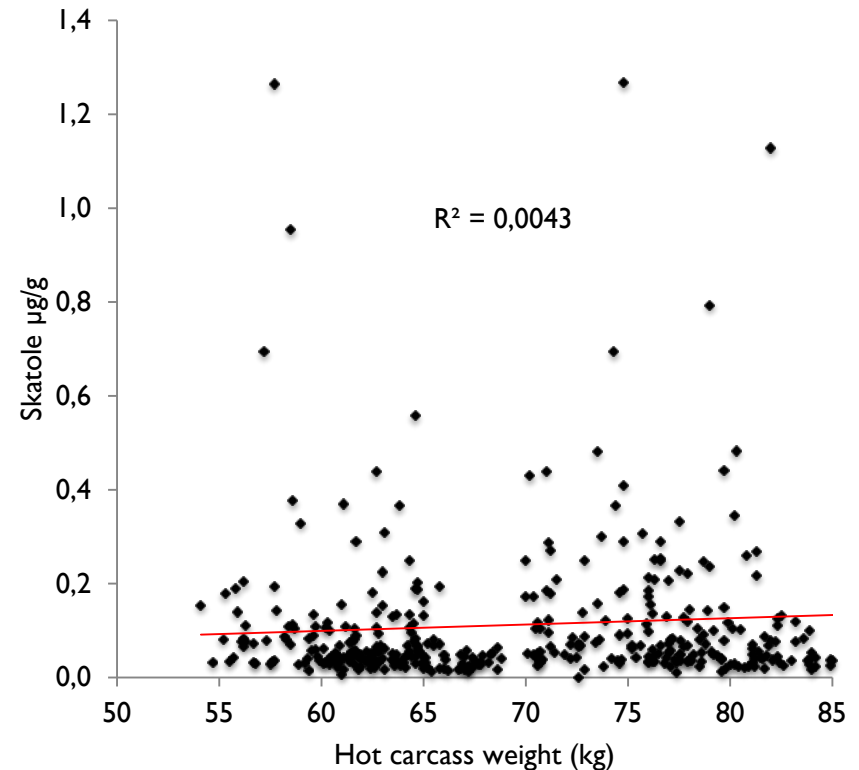
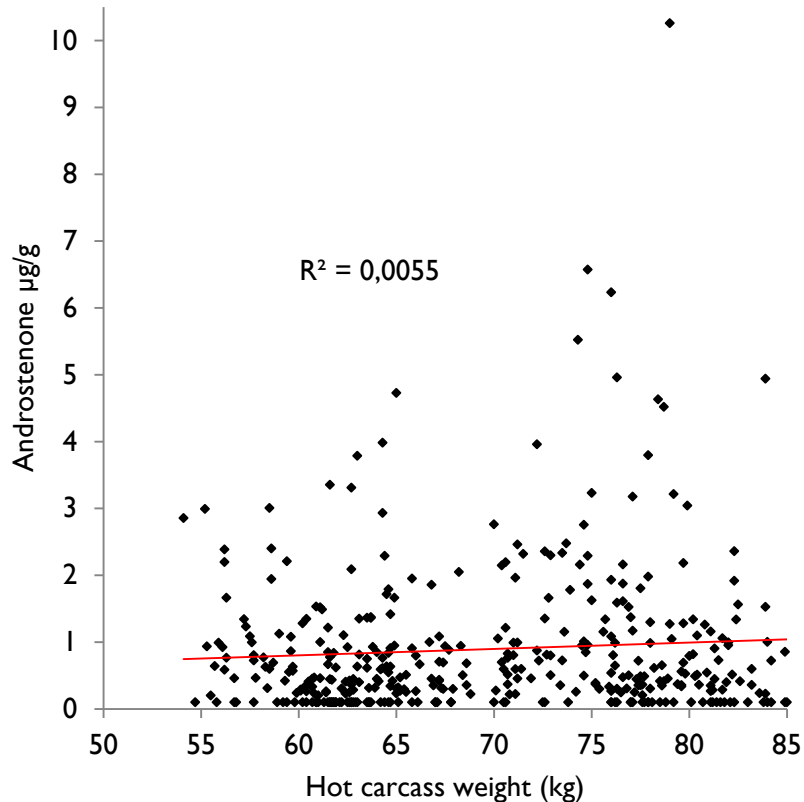
Duroc Sireline: 100% Taint



Low Taint Sireline: 4.5% Taint



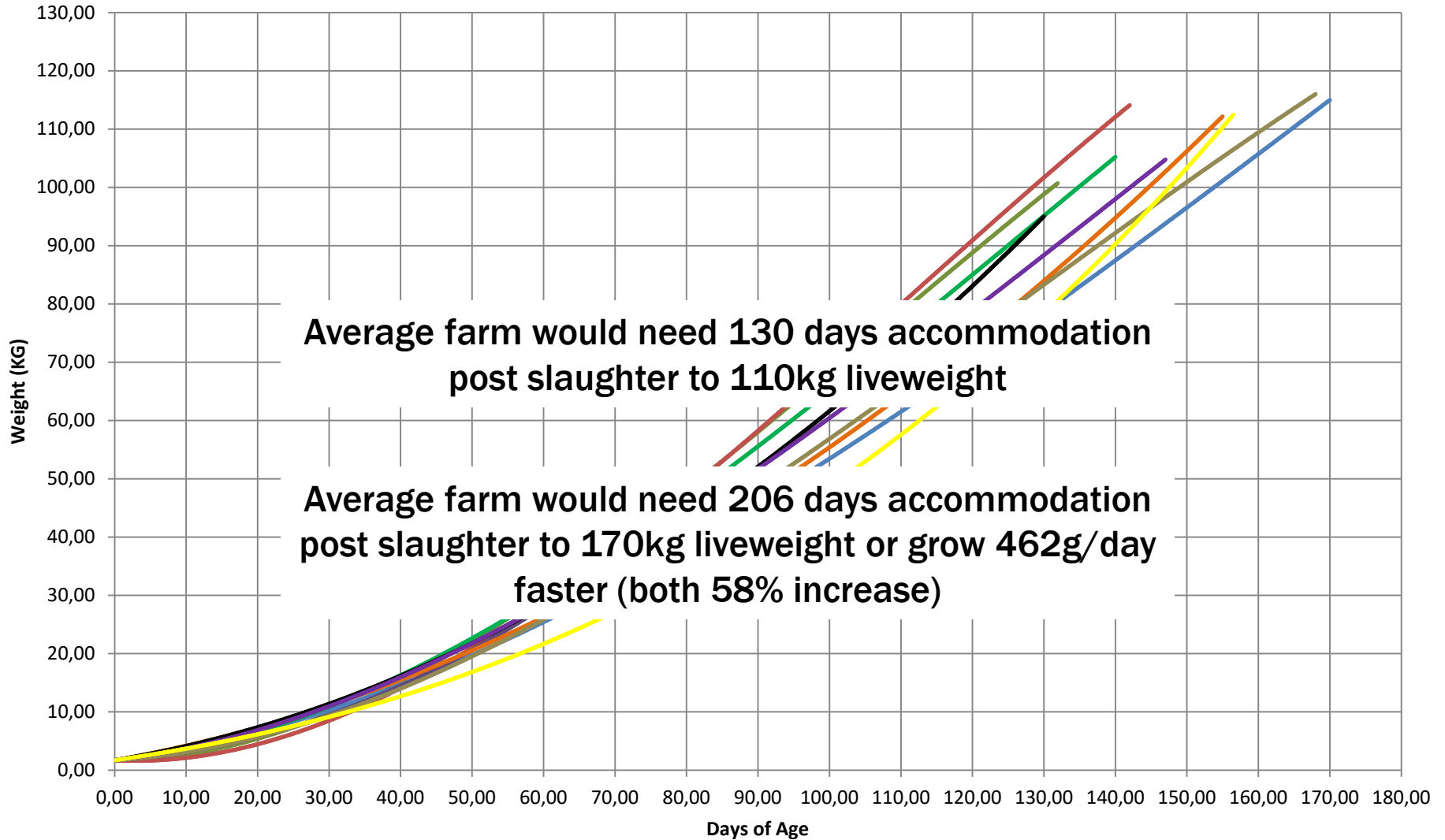
Poor correlation between boar taint risk and carcasse weight



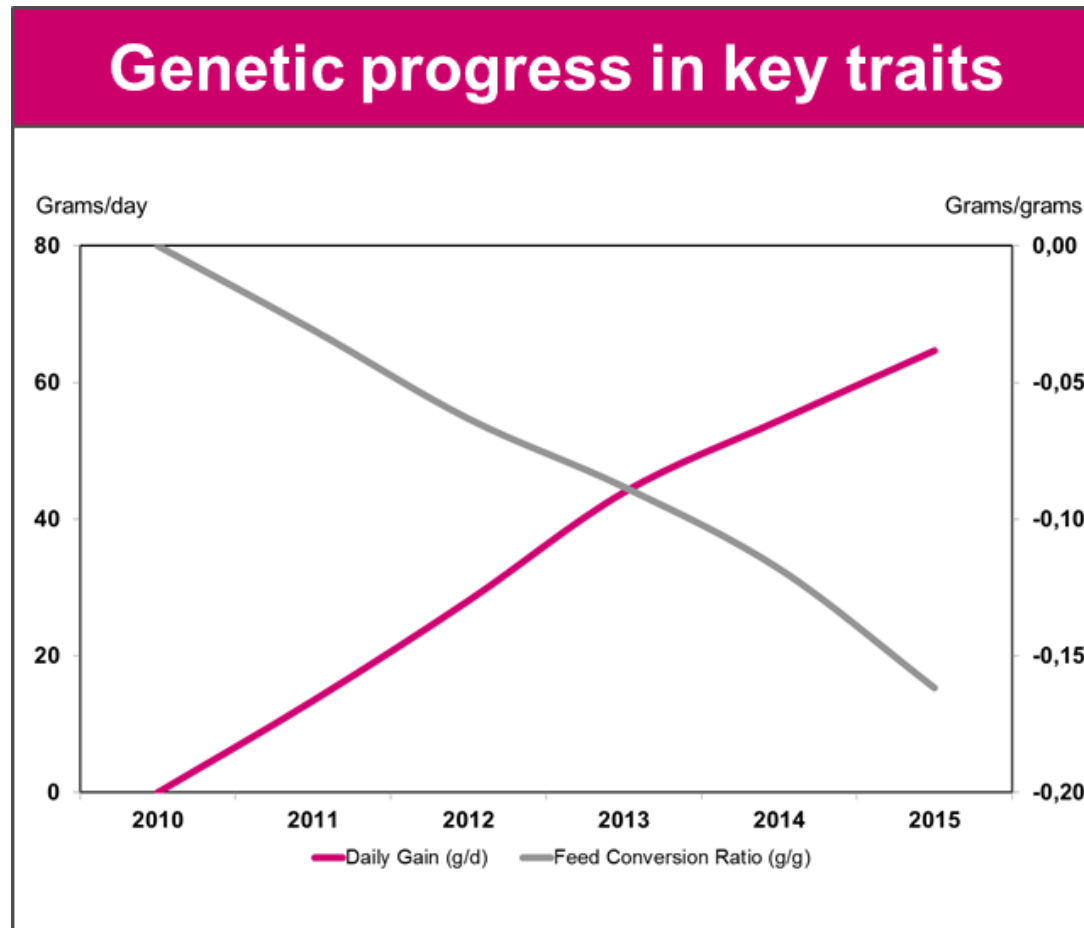
Issues With This Approach

- Consumer/Retail Demand
 - Pack & Portion size
- Shape of the Growth Curve
- Boar Taint
- **Farm Capacity**

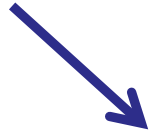
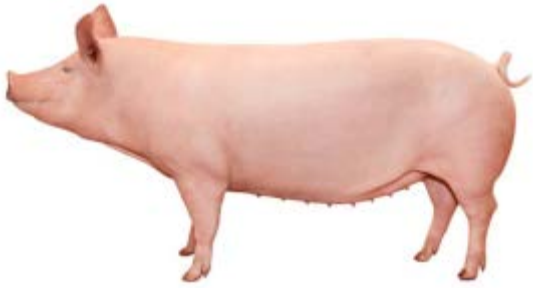
Customer Growth Curves



462g/day = 39 years genetic progress!



5 Tonne Sow: Possible?

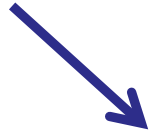


Elite Sow Output

$2.66 \times 1945\text{kg} = 5,174\text{kg} (+38.3\%)$



5 Tonne Sow: Probable?







You can never put too
much pork in your mouth
as far as I'm concerned

Lewis Black

PICTUREQUOTES.COM



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