

**Invest 0.60 DKK
- and get 3,5 kg more pig!**

..can that really be true?

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Svinedyrlæge, Porcus

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Program

A little bit about iron and hemoglobin (Hb)

Previous studies in the field

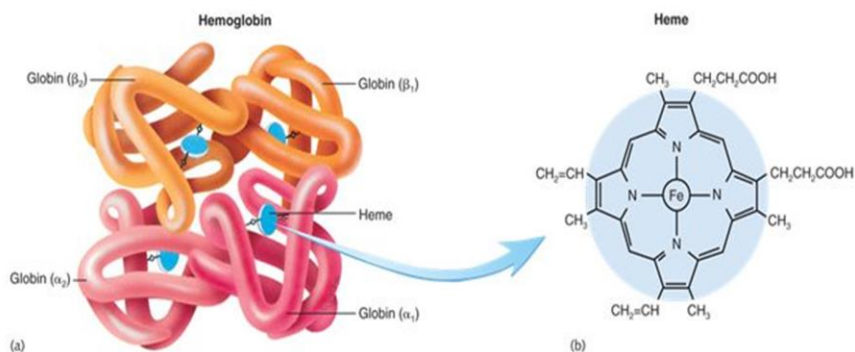
Porcus iron project

Porcus hemoglobin project



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Hæmoglobin contains iron - which binds oxygen



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Limiting factors for hemoglobin and red blood cell production

Iron

Others:
B12, B9 (folic acid) og Erythropoietin (EPO)

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200mg iron/piglet at birth - is that enough?



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200mg iron/piglet at birth - is that enough?

Total quantity iron in a piglet:

$$8.5 \% \times \text{weight (kg)} \times \text{Hb (g/l)} \times 3.4 \text{ mg/g} \times 1.25$$

Weaning weight 7 kg:

- Iron calculation at 7 kg (110 g/l):
 $0.085 \times 7 \times 110 \times 3.4 \times 1.25 = \underline{278 \text{ mg iron}}$
- Iron calculation at 7 kg (90 g/l):
 $0.085 \times 7 \times 90 \times 3.4 \times 1.25 = \underline{228 \text{ mg iron}}$

Newborn piglets:

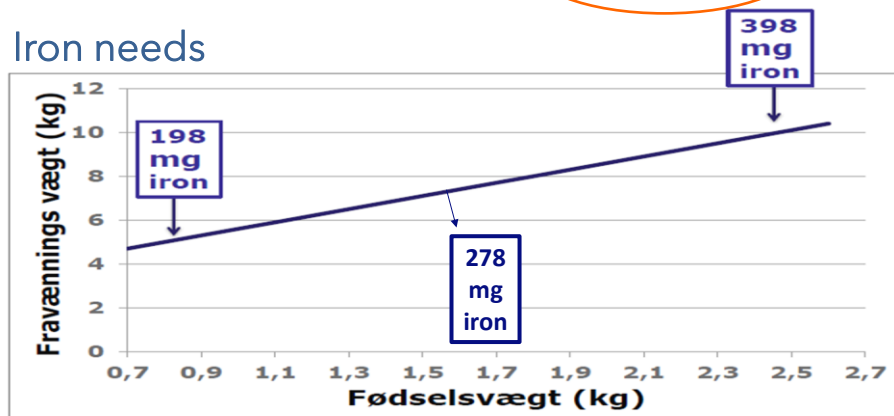
- Newborn piglet born with approx. 50 mg iron

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Iron quantity at 5, 7, and 10 kg (Hb = 110)

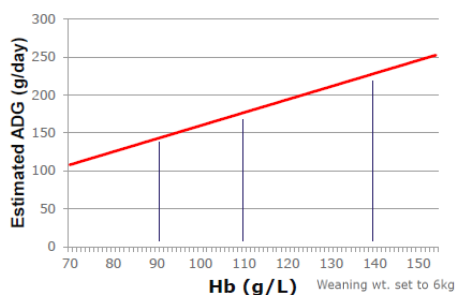
Iron needs



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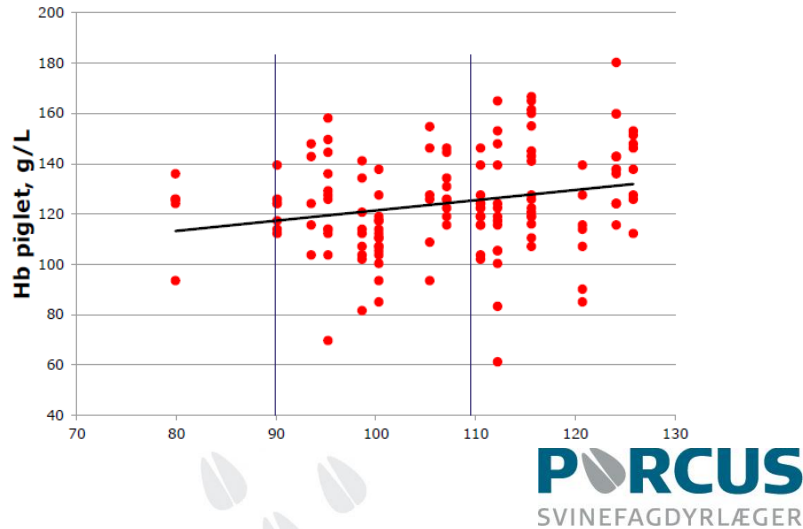
Correlation between Hb at weaning and daily weight gain (g) after weaning



For every extra 20 g/l Hb ,
We get 36 g daily gain after weaning!

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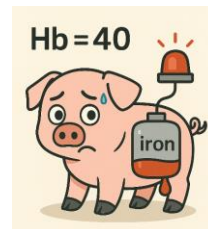
Hemoglobin levels in sows and newborn piglets



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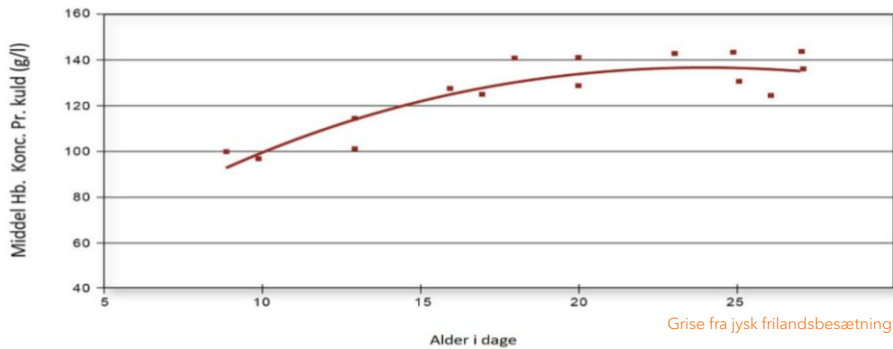
What happens with no iron supplementation?

- Born with approx. 50 mg iron (Hb \approx 100-120)
- Piglet grows and iron is "used/diluted"
- After approx. 14 days: Hb \sim 50
- Critically low at Hb = 40



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Free range pigs' hemoglobin level relative to age



- No iron supplementation
- Max level is reached within 3 weeks via the intestine

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Can we give too much iron?

With injection - YES! (but 4 double dosis is testet ok)

With oral iron - NO! (-or maybe..)



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Conclusions

- Anemia in piglets is common in Danish herds
- Large and fast-growing pigs are at the highest risk
- + 20 g/l Hb, increases post-weaning daily gain by 36 g
- Sows with high Hb levels have lower risk of deadborn
- Hb levels in sows and piglets are correlated

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HEY!



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Previous studies

BACH STUDY (2006)

PMWS pigs receiving a 2nd dose of Uniferon had significantly higher ADWG (12-32 days P.W.)

HAUGEGAARD STUDY (2008)

Healthy pigs receiving a 2nd dose of Uniferon had a significantly higher growth rate of ~20 gram per day for the first 15 days after weaning

JENS PETER NIELSEN STUDY (2015)

For every 10g/L increase in hemoglobin à ~17g/day increase in gain

FREDERICKS STUDY (2018)

Pigs receiving 400mg of iron had better wean to finish growth than those receiving 200mg

OLSEN STUDY (2020)

Pigs receiving 400mg of iron weighed more at end of nursery phase compared to 200mg



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American studies, 2023



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American conclusions

- Effect of **two injections** with iron
- **Increases** hemoglobin levels
- **+ 3 kg** at slaughter time



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Conclusions from previous studies

- Agreement on effect on growth until 3 weeks post-weaning
- New US studies show effect until slaughter
- **Can that really be true...??**
- Resulted in a new Porcus project

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Design of Porcus iron project

2 groups of piglets

- **Group 1:**
 - Only 1 injection on **day 1-2** as a control-group (Uniferron, 200 mg/ml)
- **Group 2:**
 - 2 injections total:
1 ml **day 1-2** and again 1 ml **day 6-10**
jern-dextran (Uniferron, 200mg/ml)



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Design of Porcus iron project

Individual weighing at

- Start (day 6-10)
- Weaning
- Going out of 'klima-stable'
- At slaughter (when first pigs are ready)

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Short conclusion

YES!

We could prove the surprising American results!



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Results

Porcus iron project (n:115)

	Haemoglobin g/L	Weaning, kg	Out of klima- stable, kg	Slaughter weight, kg 06.12.2024
Green, avg.	111,6	5963	29,94	92,30
Orange, avg.	113,8	6368	31,46	95,82
Difference	2,2	405	1,52	3,52
P-value	0,146	0,012	0,069	0,051
Spread, Green	14,81	1469	8,15	18,45
Spread, Orange	10,14	1427	7,14	13,23



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Results

Porcus iron project

Growth achieved with 50 days in 'klima-stable' and 55 days in finisher stable:

- 'Klima-stable':
 - Green group: 480 g/day
 - Orange group: 502 g/day
- Finisher stable:
 - Green group: 1134 g/day
 - Orange group: 1170 g/day

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Conclusions

Porcus iron project



2 iron
injections
resulted in →



Higher
slaughter weight
(weight gain)



Less spread on
slaughter weight

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Possible biological explanations for the effect of extra iron

- Reduced performance if oxygen is lacking in the body:
Iron may be a limiting factor
- Upregulation of genes/processes in the liver
- Upregulation of genes/processes in the small intestine
- Improvement of microbiome (more lactobacilus)



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Porcus hemoglobin project - why?

- Compare iron supplementation methods and Hb levels
- New iron delivery methods
- Litter size still continue to increase
- Need for new comparisons
- Standardized sampling
- We would like YOUR herd in the project!



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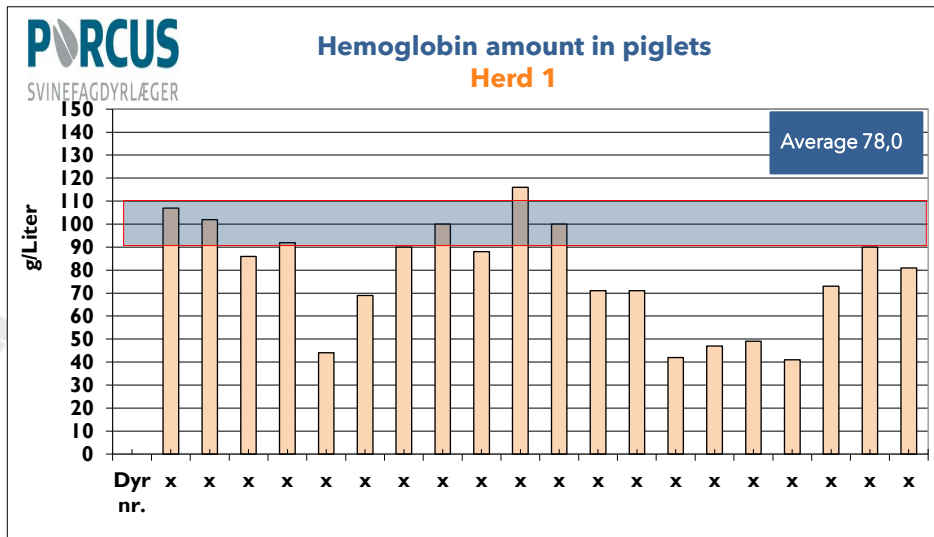
Diagnostics of hemoglobin levels in piglets

Several good reasons:

- Anemia and low Hb levels are **common**
- Feed intake is highly **variable** (30-50% eats!)
- **Iron injection** may not always be properly done (backflow)?
- Help for **calibration** of oral iron or iron in bedding
- **Low Hb-levels** can occur without clinical symptoms

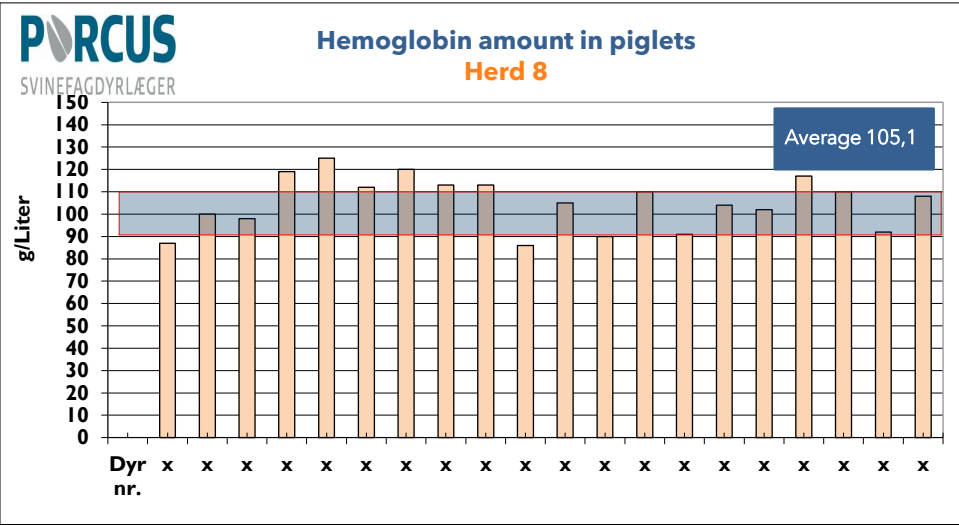
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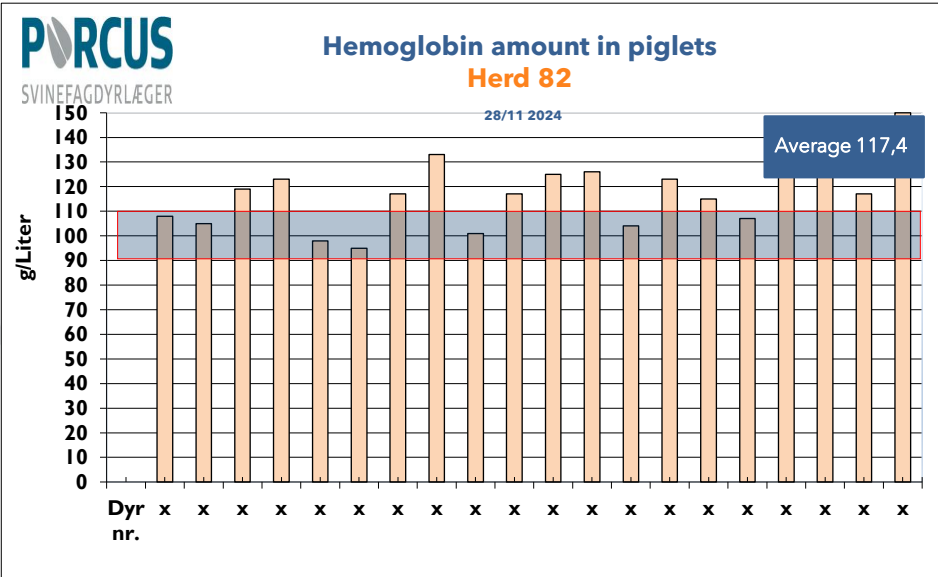
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Take Home Message

-Everybody has the right to extra 3,5kg!!



One extra iron injection resulted in 3,5kg more slaughter weight



Achieved through an increased growth of +22g in 'klima-stable' and + 36 g in finisher stable



There was less variation in slaughter weight after one extra iron injection



It is highly relevant to check the hemoglobin levels of your piglets

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