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Tail position as a pig welfare indicator in commercially raised pigs with intact tails

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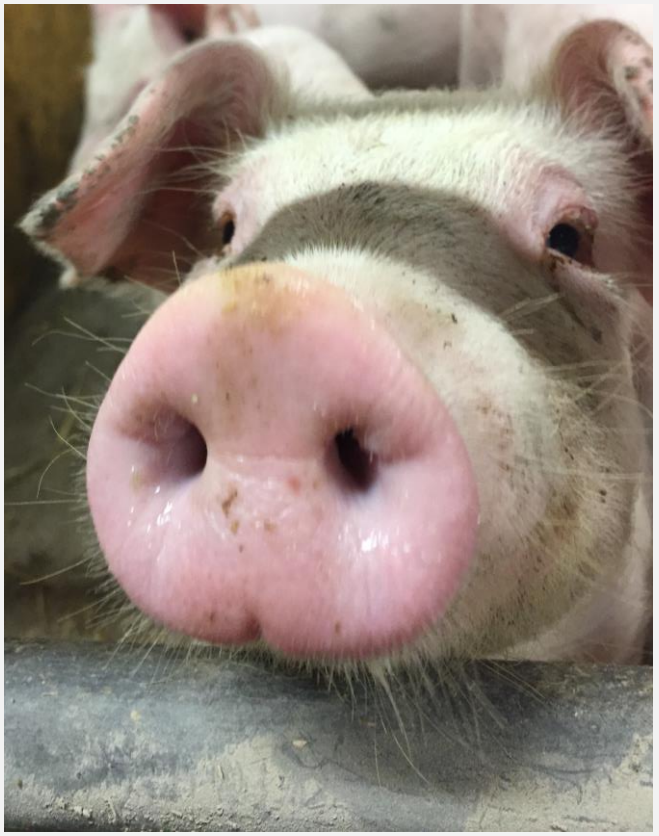
Why do commercial pigs lack tails?

- Tail biting
- Tail docking
- EU legislation

What is tail biting?

- Exploratory behaviour
- Multifactorial
- Outbreaks
- Quick escalation
- Blood attraction



E.g. D'Eath 2014, Fraser 1987

How can we detect outbreaks?

- Wounds
- Behaviour
- Tail position

Aim:
Can tail position be used to predict tail biting in commercial settings?

E.g. Kleinbeck and McGlone, 1993, Zonderland et al.,m 2009, Wallgren et al. 2016, Lahrmann et al., 2018

How was it done?

- Compare tail lesions and position
- Commercial finishing pigs
- 460 pigs, 42 pens
- 102 days /14 obs
- December 2017- March 2018

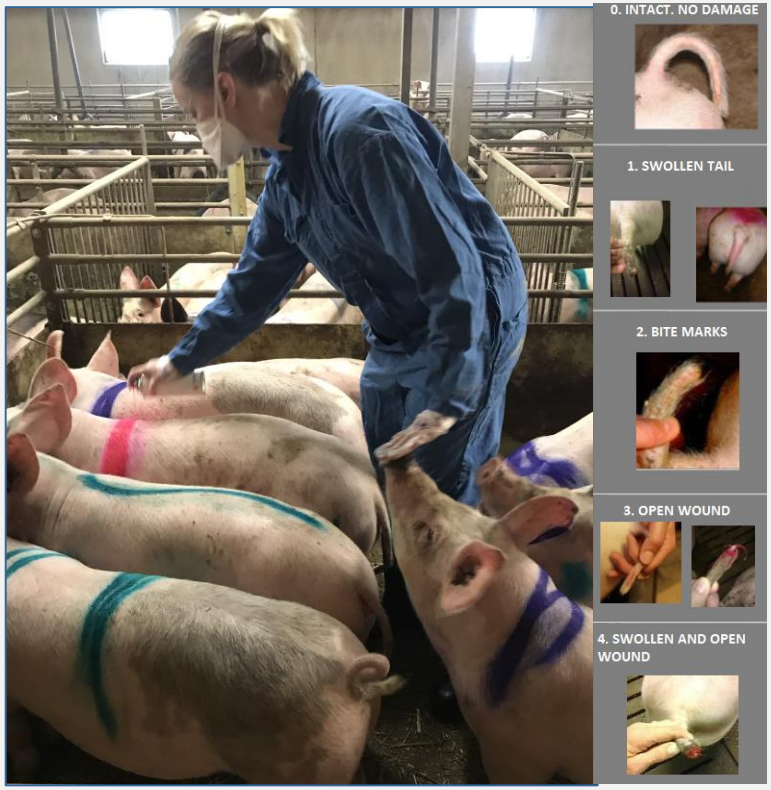
How was tail position scored?

- Hanging or curled
- At feeding
- Filmed

How was tail lesions scored?

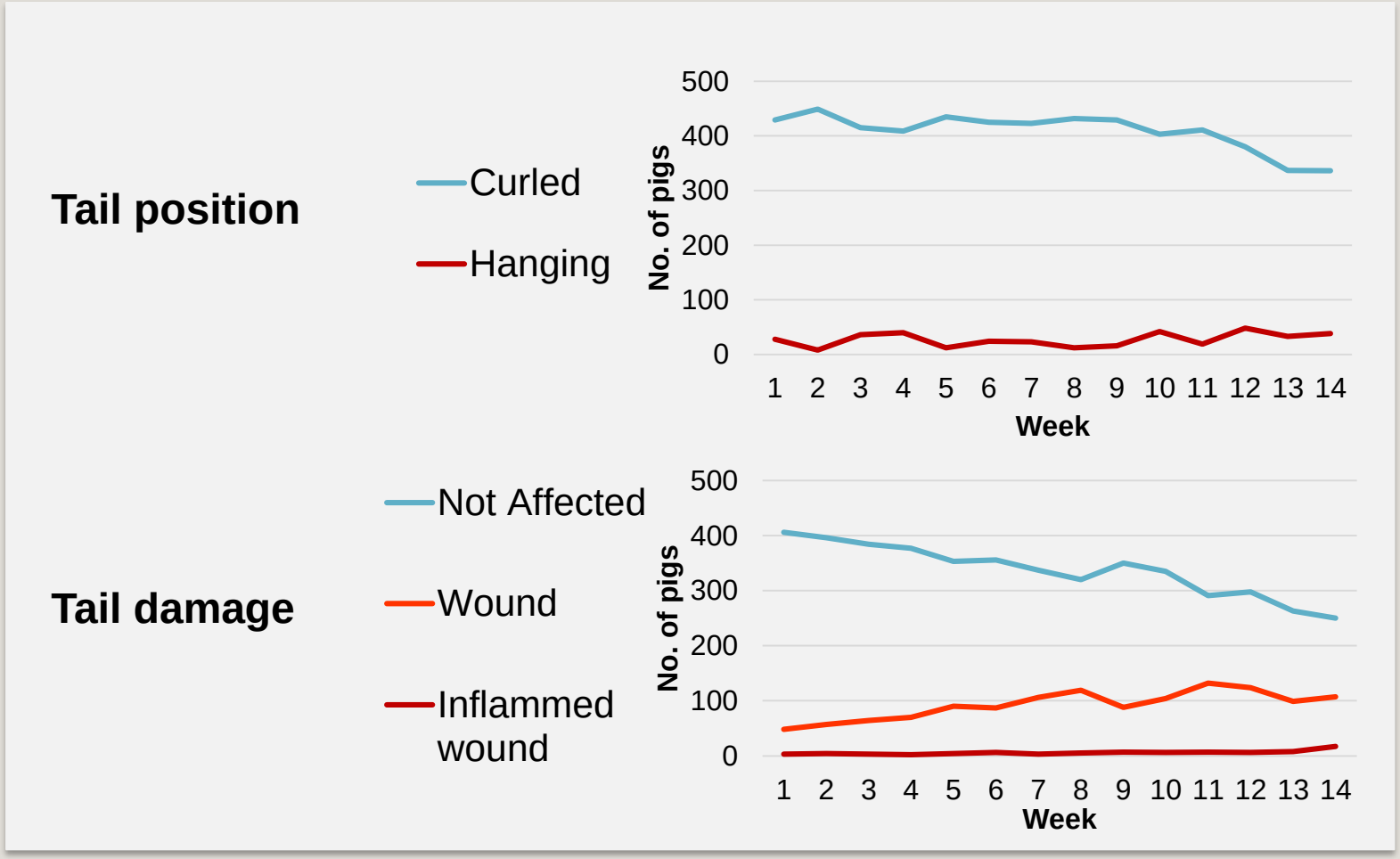
- Length
- Damage
- Freshness

Zonderland et al., 2003



Results

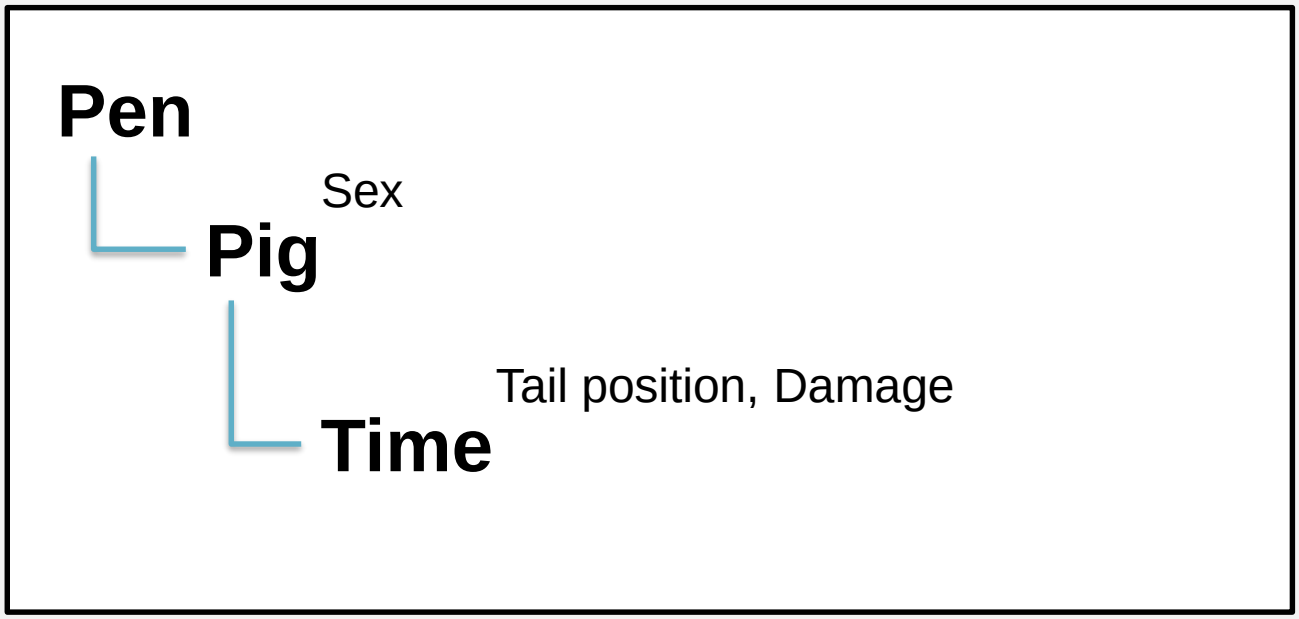
How did tail position and damage change over time?



How did pigs react?

	Week																													
Damage	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
Intact	315	14	315	2	281	17	252	22	250	3	214	7	202	9	199		238	4	206	8	179	3	186	7	178	5	148	6
Swollen	41	2	41		41	2	33	4	46	2	47	1	42	1	54	2	27	1	66	6	47		49	4	35	2	40	5
Bitemark	32	2	38		42	1	66		51	1	83	4	81	2	64	1	80		44	5	60	2	46	6	40	3	49	2
Wound	40	8	52	5	50	14	58	12	85	5	77	10	95	11	112	7	79	9	84	20	120	12	96	28	79	20	90	17
Inf. wound	1	2	3	1	1	2	0	2	3	1	4	2	3		3	2	5	2	3	3	5	2	3	3	5	3	9	8
Total	429	28	449	8	415	36	409	40	435	12	425	24	423	23	432	12	429	16	403	42	411	19	380	48	337	33	336	38

Can TP predict tail biting?



$$Tail\ position_{\pi sTime,ID,Pen} = \beta_{0ID,Pen} + Damage1_{Time,ID,Pen} + Damage2_{Time,ID,Pen} + Damage3_{Time,ID,Pen} + Damage4_{Time,ID,Pen} + Sex(castrate)_{ID,Pen} + \beta_{5ID,Pen} sTime_{Time,ID,Pen} + \beta_{6ID,Pen} sTime^2{}_{Time,ID,Pen}$$

Tail damage is related to tail position

Odds ratio

$$Tail\ position\ _{\pi sTime,ID,Pen} =$$
$$0.0069\beta_{0ID,Pen} +$$
$$1.46\ Damage1_{Time,ID,Pen} +$$
$$14.24\ Damage2_{Time,ID,Pen} +$$
$$\mathbf{4.15\ Damage3_{Time,ID,Pen}} +$$
$$\mathbf{14.24 Damage4_{Time,ID,Pen}} +$$
$$\mathbf{1.58\ Sex(castrate)_{ID,Pen}} +$$
$$1.12\ \beta_{5ID,Pen} sTime_{Time,ID,Pen} +$$
$$2.09\ \beta_{6ID,Pen} sTime^2{}_{Time,ID,Pen}$$

Pen
*var(cons)*1.51
var(sTime) 1.90

Cov (sTime, cons) 1.12

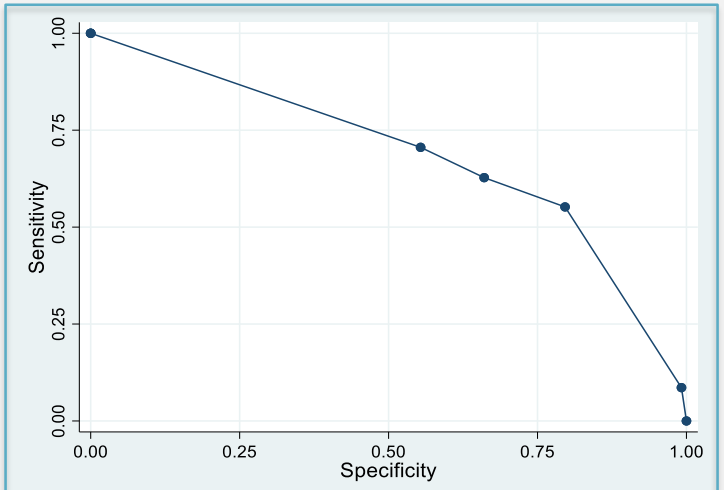
***ID*:**
var(cons) 27.41
var(sTime) 1.40
Var($sTime^2$) 3.30

Cov (sTime, cons) 0.99
Cov ($sTime^2$, cons) 0.32
Cov (sTime, $sTime^2$) 0.32

What does it mean?

Tail position is affected by…

- Severe tail damage
- Sex
- Time/age
- Individual/Pen variation



Cutpoint	Sensitivity, %	Specificity, %	Correctly classified, %
0	100	0	6,28
1	70.57	55.38	56.33
2	62.76	66.05	65.84
3	55.21	79.62	78.09
4	8.59	99.16	93.72

What about..?

- *Time* at scoring
- Pain threshold?
- Specificity
- Sensitivity

Take home messages

- Tail position, at feeding, is correlated to severe tail damage
- Individual variation is larger than variaion between pens
- Specificity and sensitivity suggests that tail position cannot be the only measurement
- Pigs can be reared without tail docking

Thank you for listening!

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