Seasonal Infertility: Boar Better® improves reproduction during summer heat stress

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Seasonal Infertility

- Breeding pigs show summer depression in reproductive performance around the world
- Lower late summer fertility rates are biologically ingrained in the pig so that they don't have litters in the late fall or winter
- Seasonal infertility is a function of photoperiod and warm temperatures, but years with warmer temperatures have a more severe problem
- Some sows continue to breed, even in warm weather

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Seasonal Infertility

- Hurtgen and Leman (Theriogenology, 1981) reported on herd average farrowing rates through the seasons.
- Sows bred in August through October have lower farrowing rates than in Winter and Spring.
- Breeding rates, farrowing rates, litter size and wean-to-service intervals are negatively impacted in late Summer/early Fall.

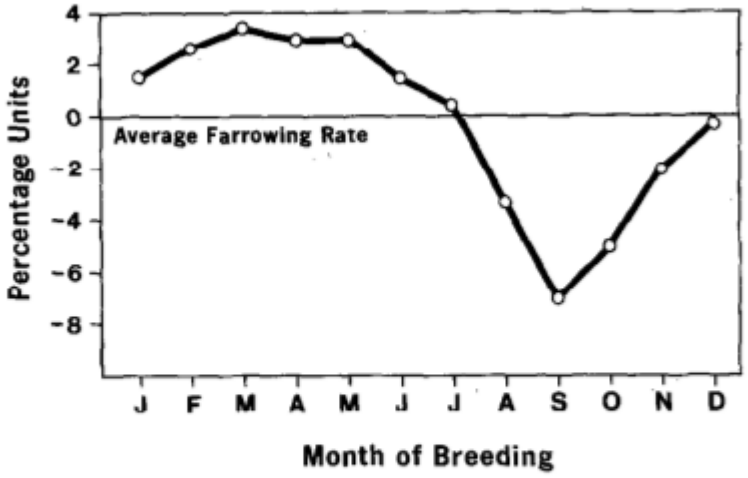

Figure 2. Difference between the monthly and yearly farrowing rate for sows bred within 7 days after weaning in 7 confinement herds.

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Seasonal Infertility

- Rensis et al. (Theriogenology, 2017) reviewed hormonal mechanisms by which heat stress can alter reproduction.
- Stress disrupts:
  - Hormones
  - Behavior

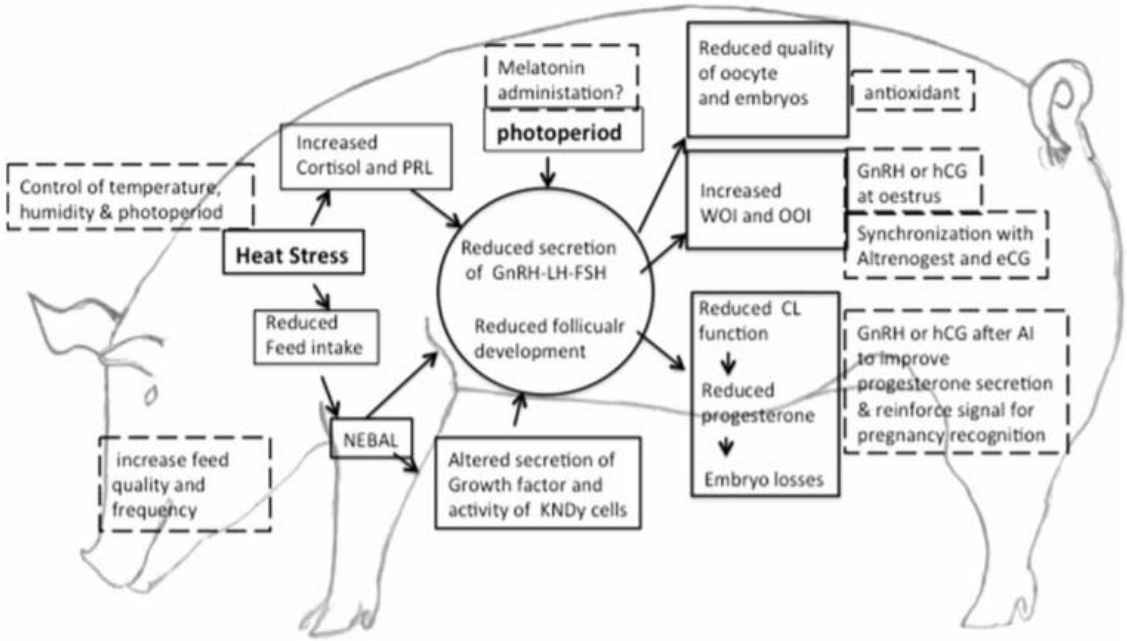

Fig. 1. A schematic description of the possible mechanisms for the effect of heat stress and photoperiodism on reproduction in female pig. Heat Stress can directly influence the hypothalamo-pituitary system or indirectly by reducing dry matter intake. Long day photoperiodism can influence fertility. In dashed line are described some intervention to counteract seasonal infertility in female pig. NEBAL = negative energy balance. KNDy = kisspeptin/neurokinin/dynorphin.

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The Boar Pheromone

- Animal Biotech developed a TTU discovery of a new boar pheromone in 2018
- Boar Better® contains 3 active molecules found only in boars saliva (not in sow saliva)
- Boar Better® is a patented mixture of synthetic molecules meant to be a substitute for boar saliva – BB contains no animal products

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Summer Study Using BB

- A study was organized to determine if BB could improve summertime reproduction.
- The farm was in the Southern High plains at an elevation of 3,990 feet above sea level.
- Two treatments were included:
  - Control (PCAI breeding as usual)
  - BB (BoarBetter sprayed on days 4 and 5 after weaning)
- July, 2018 with Farrowing in the Fall of 2018
- Breeding, conception and farrowing rates (FR) and Farrowing Success Rate (FSR)
  - FR, % = #farrowed/#bred
  - FSR, % = #farrowed/sows weaned

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Local weather data 2018
BB sprayed in July

	Air Temperature			Dew Point Temperature			Rain, inches	
Month	Min	Max	Avg	Min	Max	Avg	Avg/d	Total
June	51	101	77	16	66	53	0.12	3.6
July	**53**	**107**	**79**	**37**	**77**	**56**	**0.02**	**0.6**
August	55	101	77	41	65	56	0.05	1.55
September	41	95	71	23	63	52	0.01	0.31
October	29	93	56	15	64	41	0.15	4.65
November	12	74	42	5	42	25	0	0
December	5	66	36	1	50	19	0.04	1.24
							Total	11.95
							Monthly avg	1.71

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Breeding, Conception and Farrowing Rates

Sows and Rates	CON	BB	
Total sows	756	1118	
Bred sows	661	1049	
Preg check +	594	962	
Farrow	475	837	Diff
BR	87.4%	93.8%	6.4%
CR	89.9%	91.7%	1.8%
FR	71.9%	79.8%	7.9%
FSR	62.8%	74.9%	12.0%

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Litter size of C-29 sows

Measure	CON	BB	Diff	SE	P-value
# Sows or litters	415	826	--	--	--
Live born/sow	11.44	11.98	0.54	0.15	0.009
Stillborn/sow	1.18	0.87	-.31	0.05	0.0003
Total Born/sow	12.95	13.24	0.29	0.16	0.22

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Model of 100 sows without and with BB

Item	CON	BB
Eligible sows	100	100
FSR, %	62.8	74.9
Farrowed sows	62.8	74.9
Born alive/litter	11.4	12
Total pigs/batch	716	899
Difference/batch		183
% Difference/batch		25.5%

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Conclusions

- Use Boar Better during summer heat stress to:
  - Improve breeding rate 6%
  - Improve farrowing success rate 12%
  - Improve pigs born alive per litter +0.54 pigs
  - Reduce stillbirth rates by 0.3 pigs/litter
  - Increase pigs produced per batch of sows by 25%

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