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Modifications of biotechnical methods help to reduce variations in reproduction performances in sows

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In the last years the reproduction performances increased strongly. Today the reproduction performance of sows is more than 27 weaned piglets per sow and year. In the average, the genetic potential is about 32 alive born piglets per sow and year.
In summer high temperatures are stress for sows mostly. This situation often affects the metabolism and reproduction physiology in high performance sows strongly. As a result of that the reproduction performance of sows can be reduced.

Heat is stress for circulation

- Mechanism for regulation of body temperature are very active
- Balance of water-acid relation is destroyed
- Control of body temperature is difficult in environmental temperature >25^{O} C because energy intake is reduced – increasing of temperature about 1^{O} C = 100g reduced feedintake
- If temperature is higher than 25^{O} C secretion of gonadotrophins will be reduced (FSH, LH)
- Reduced secretion of Insulin, IGF 1 and Thyroxin
- Limited growth of follicles (secretion of estrogen and estrous behaviour are reduced) and more cysts. , reproduction performance can be reduced (fig. 1).
- Young sows (gilts and primiparous sows) are more sensitive than older sows. This situation demands zoo- and biotechnical activities expecting assistance for reproduction endocrinology in sows

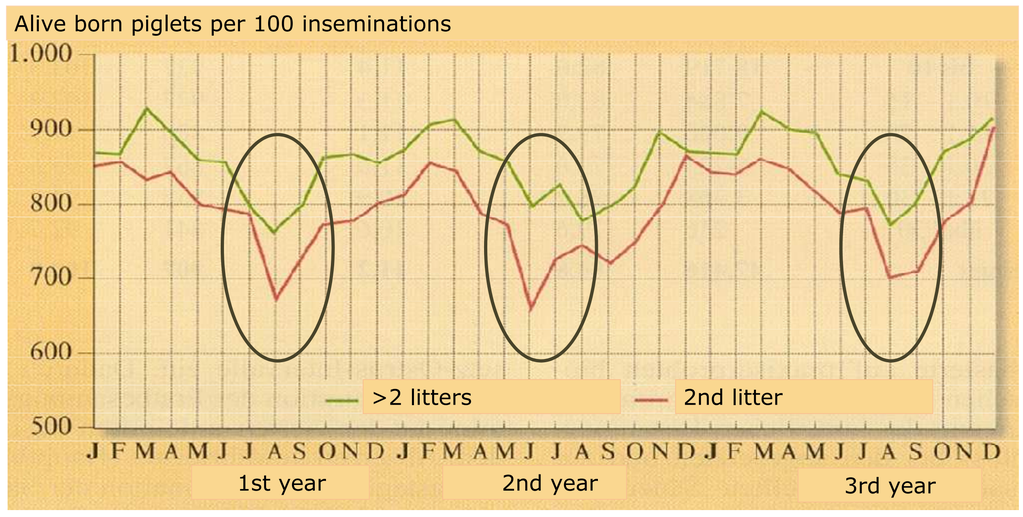

Fig. 1: Saisonal variations in fertility in sows

Aim

Modification of biotechnical methods to adapted on special and individual situations in farms. Following biotechnical methods are included:

- Time distance between last application of REGUMATE® and eCG-injection in synchronized gilt.
- PMSG-dosage for cycle-stimulation in primiparous sow should be 1000 IU, in older sows only 800 IU.
- GnRH-preparation has a higher effect than hCG in stimulation of ovulation in gilts and sows. In comparison to spontaneous estrus in sows the time of ovulation is affected by different hormonal stimulation.
- During summer oxytocin supplement in semen stabilize pregnancy rate in sows.

Materials and Methods

Several practical farms with 1000 - 2000 sows (Large White x German Landrace)
Experimental group (n = 1000).....800 IU eCG
Control group (n = 1093).....no hormons

Parameters: estrus behaviour
Number of corpora lutea (c.l.) ... n = 18
Number of embryos at day 28 of gestation
Pregnancy rate, litter size

Results 1-4

1. Time distance between REGUMATE® and eCG in synchronized gilts

Tab. 1: Influence of distance between last medication of REGUMATE® and eCG on physiology of reproduction in gilts (LAU, 2008)

eCG hours after Regumate®	n	c.l. (n)	foetuses (n)
24 h	8	15.4 ± 1.78	13.0 ± 4.11
41 h	6	16.0 ± 2.68	13.3 ± 3.44
48 h	7	17.7 ± 6.07	15.7 ± 6.32

Tab. 2: Influence of distance between last medication of REGUMATE® and eCG on reproduction performance in gilts (SCHNURRBUSCH, 2002)

eCG hours after Regumate®	n	pregnancy (%)	born alive /litter (n)	born alive/100 FI (n)
24 h	953	75.6	9.58	724
40 – 42 h	1050	83.4	10.40	870

2. Comparison of GnRH and hCG for stimulation of ovulation

Different treatment of gilts for synchronization of ovulation 82 hours after eCG
Experimental group...(n = 425).....50 µg GnRH
Control group.....(n = 480).....500 IU hCG

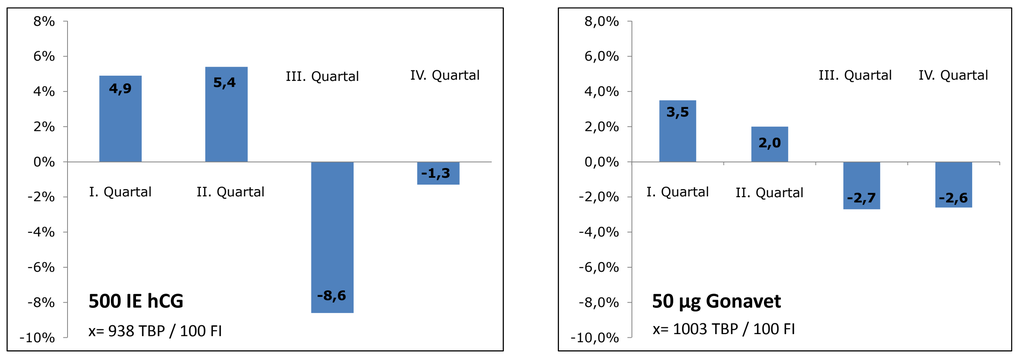

Fig. 2: Saisonal variations in reproduction performance in gilts depends on hCG- or GnRH-injection for stimulation of ovulation

3. Influence of cycle stimulation in weaned sows depending on season

Sows in experimental group got 800 IU eCG 24 hours after weaning for cycle stimulation. Sows in control group got no biotechnical treatment.

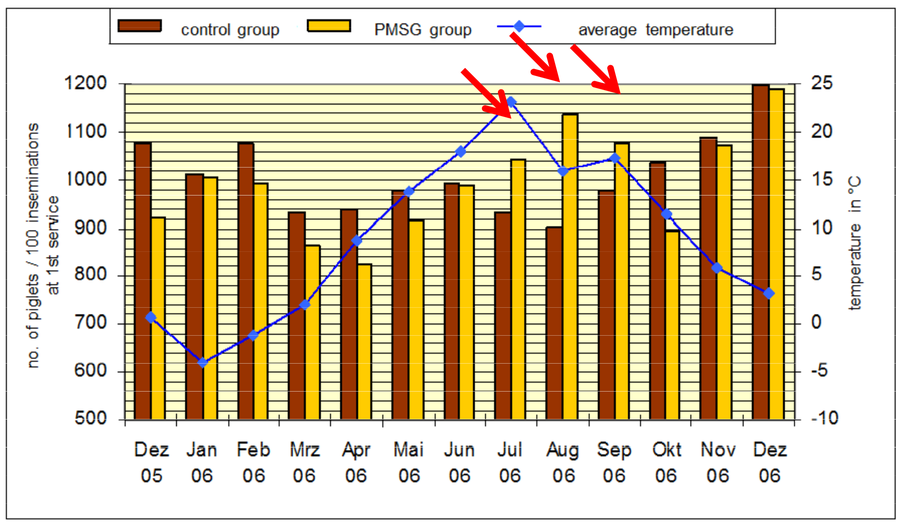

Fig. 3: Piglets born alive per 100 inseminations at 1st service as a function of stimulation of cycle

Tab. 3: Piglets born alive per 100 insemination at 1st service according to the season and the age of sows as a function of stimulation of cycle

litter	winter		spring		summer		autumn	
	Contr.	eCG	Contr.	eCG	Contr.	eCG	Contr.	eCG
2	1099	855	806	820	862	**1072^{a}**	1013	1088
3 – 5	1081	1078	946	946	1009	1131	1183	1118
>5	959	936	788	788	850	**997^{b}**	942	948

^{a,b} p<0.05

4. Influence of Oxytocin supplementation in boar semen depening on parity

Supplementation of 10 IU Oxytocin into boar semen portion helps to stabilize pregenancy rate in sows.

Experimental group....(n = 501).....10 IU Oxytocin (Ventoquilen®)
Control group.....(n = 885).....no Oxytocin

Tab. 4: Influence of 10 IU Oxytocin in boar semen pertion on reproduction performance

no. of litter	without Oxytocin			10 IU Oxytocin		
	n	pregnancy (%)	born/ litter (n)	n	pregnancy (%)	born/ litter (n)
2	206	**80.0^{a}**	10.6	112	**90.9^{b}**	10.7
3	165	83.8	11.0	96	89.6	10.4
4	120	88.0	11.1	69	95.6	11.2
5	79	86.5	10.7	60	89.7	10.9
6	72	94.2	10.7	42	92.7	10.8
>6	243	76.4	9.8	122	84.6	9.5
total	885	82.5	10.6	501	89.8	10.5

^{a,b} p<0.05

Conclusion

- Biotechnical synchronization of estrus in gilts and weaned sows. Especially the time distance between last application of REGUMATE® and PMSG-injection should be longer then 24 hour. Optimum is 42 hours. Generally a biotechnical stimulation by PMSG affects the reproduction performances in summer positively.
- PMSG-dosage for cycle-stimulation in primiparous sow should be 1000 IU, in older sows only 800 IU.
- GnRH-preparation has a higher effect than hCG in stimulation of ovulation in gilts and sows. In comparison to spontaneous estrus in sows the time of ovulation is affected by different hormonal stimulation.
- During summer Oxytocin supplementation in boar semen stabilizes pregnancy rate in sows.

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