Scientific meeting of Ningbo Sancheng Pharmaceutical- CO., LTD, April 2017

Biotechnical synchronization of cycle in sows for management in piglet production with group farrowing system

德国母猪生产批次化技术

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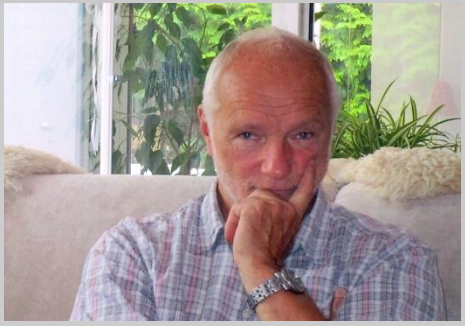
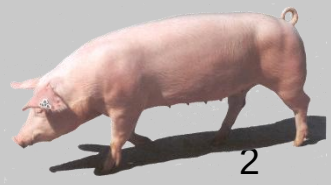


Structure内容

- Requirements to piglet production in present time
- 当前仔猪生产的需求
- Synchronization of estrus – group farrowing system
- 同期发情-批次分娩
- Sows经产母猪
- Gilts后备母猪
- What is to be considered? 需要考虑什么？
- Effects 效果
- Synchronization of parturition 同步分娩



Requirements on the pig industry / piglet production:猪场/仔猪生产的需求

- Timed organisation of main processes in piglet production 定时组织仔猪生产
- Ensuring continuous high reproductive and growth performance 确保连续的高效繁殖和生长性能
- Keep a high animal health level
  stable management „All in – all out“
- “全进全出”确保动物健康水平高
- Ensuring the required qualities in the animals and in the products 确保动物及其产品的质量

Genetic遗传

Feeding and housing

饲养和圈舍

Health, Hygiene

健康卫生

Management of reproduction

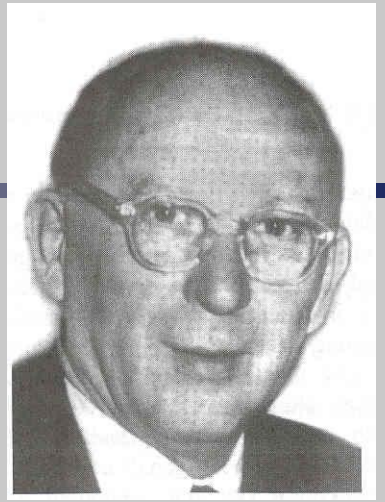
繁殖管理

Main points for reproduction management in piglet production:

仔猪生产繁殖管理的要点

- Dates for zoo- und biotechnical treatments according to the reproduction-cycle of the sows!
- 根据经产母猪生殖周期采用生物技术方法
- Time intervals between individual treatments according to the respective duration of the biotechnology!
- 生物技术方法处理的间隔
- Special kind of used hormone preparations!应用到的激素制品
- Dosage of the preparations to be administered, taking into account parity and season! 给药剂量要考虑到胎次和季节的影响
- Compliance with physiologically based appointments and time intervals for the inseminations within the estrus! 发情时的输精间隔
- Date for the induction of parturition in sows with longer gestation!较长孕期母猪诱导分娩数据

Prof. Dr. Dr. h.c. Fritz Hofmann:



1935: Piglet production with Group Farrowing System in East Germany (Kurmark/Ostpreußen)

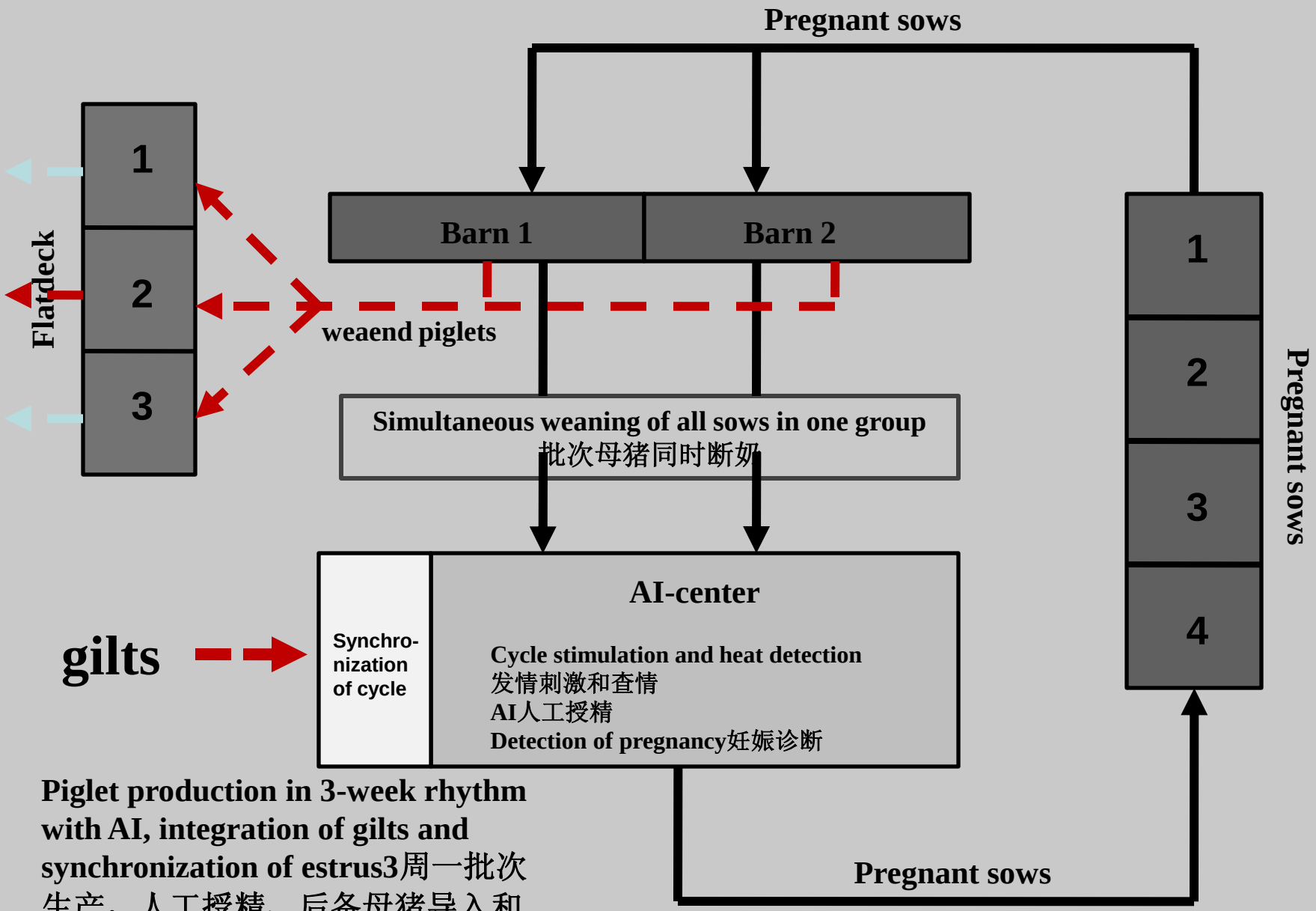
1935：东德批次化分娩产仔

ab 1958: Universität Jena 1958年全进全出，牧场应用人工授精

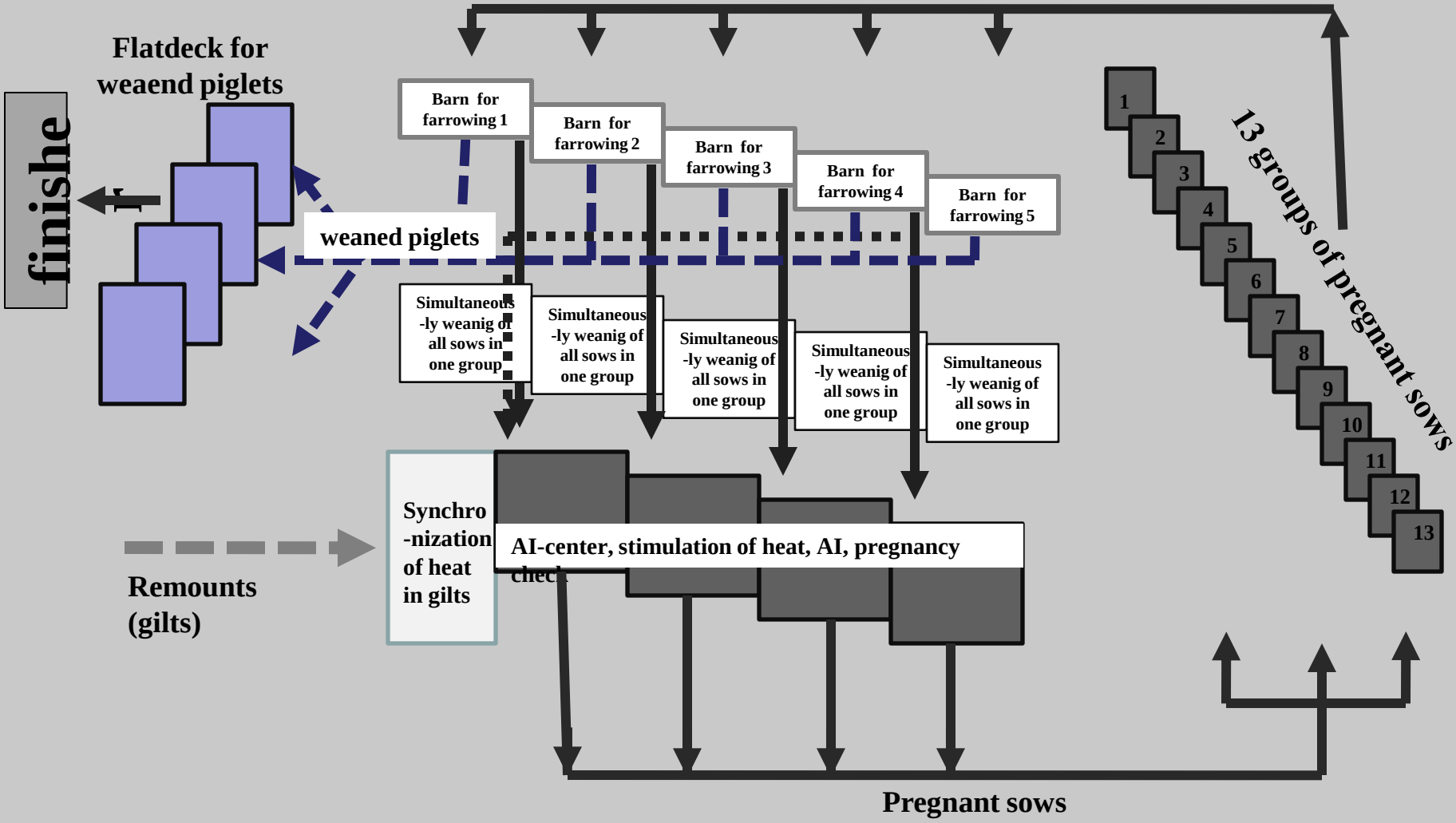
Perfection of piglet production in groups:

„All in – all out“

Application of AI in farms!



Piglet production in 3-week rhythm with AI, integration of gilts and synchronization of estrus3周一批次生产，人工授精、后备母猪导入和同期发情



Scheme for piglets production with group farrowing system in 7-day-rhythm
21 groups of sows, 5 barns for farrowing
1周批批次化时间表，母猪21批，4-5批产房，3-4批配种中心、13批妊娠

Effects of synchronization of estrus for management in herds of sows猪群管理同期发情效果：

- Clear relief of the work, simple and more sure heat detection in gilts.
- 后备母猪发情检测轻松、简单、可靠
- Optimal utilization of existing space capacities in the waiting area and farrowing stables 充分利用产房
- Optimal exploitation of the genetic performance potential of the sows, i. Fertilization result and litter size 最佳发挥母猪遗传潜力，特别是繁殖结果和产仔数
- Continuous production and related effective use of the workforce连续生产和相对有效利用厂房设施
- Protection of animal health保护动物健康
  - All-in- All-out procedure全进全出
  - temporally compressed births limited pathogens enrichment in the barn减少产房病原体富集
  - concentrated nursing care for sow and piglets with cross forstering 有利于母猪和仔猪见交叉集中护理
- Work with the same animal groups - specialization effects in the colleagues
- 同一猪群-便于采取专门化管理

Synchronisation of estrus

同步发情

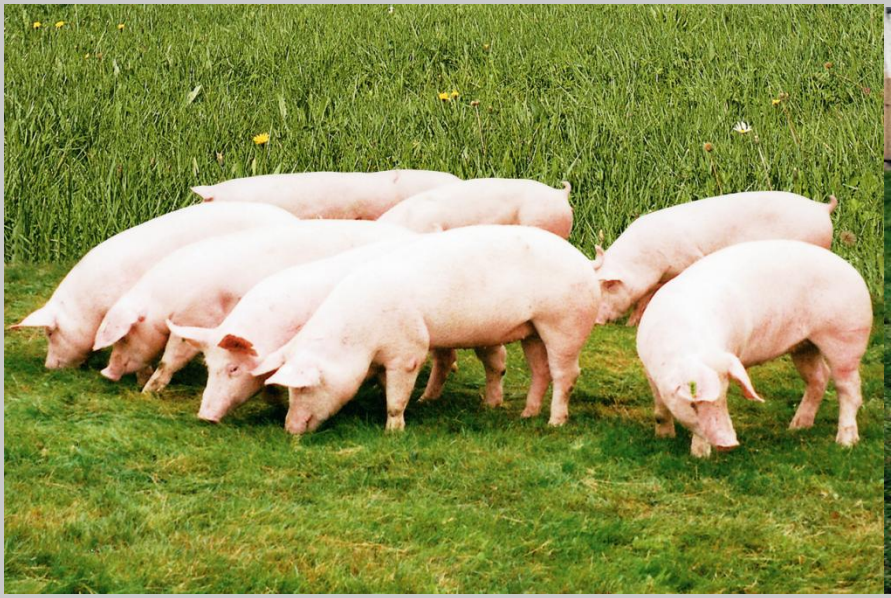
- **zootechnical methods: 畜牧学方法**

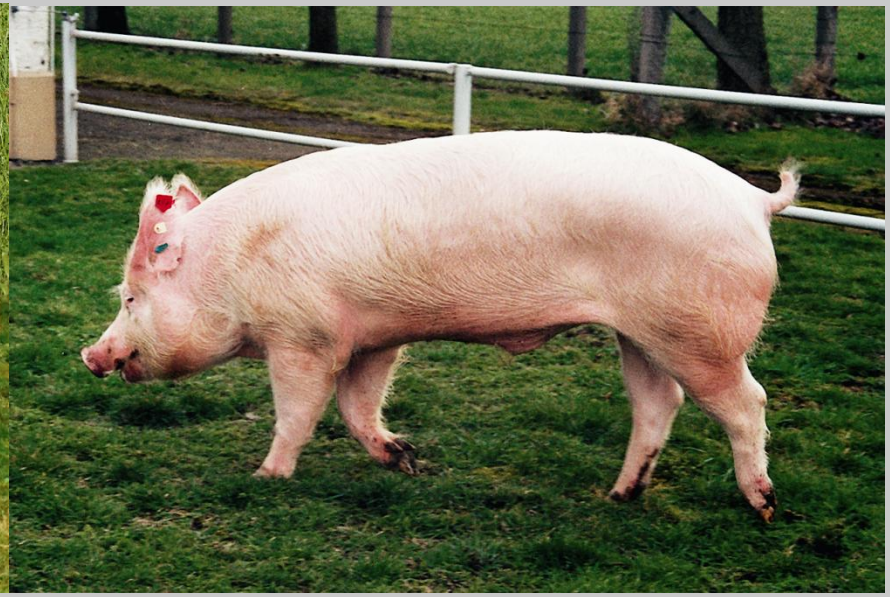
  ⇨ **after suckling weaning of all sows in the same time is the most important activity for cycle synchronization in sows** 所有经产母猪同期发情最重要的活动是同一时间断奶

  ⇨ **stimulation by environments**环境刺激

- **biotechnical methods**

Zootechnical methods for stimulation of estrus刺激发情的畜牧学方法





Contact to boar, sows in heat

接触公猪

change of environment

环境改变

Nutrition 营养

other factores Faktoren

Example for zootechnical stimulation of cycle in young gilts for preparing AI青年母猪管理范例

Day of life	What to do:
160	Gilts come in new farm – isolation! (gilts come from other farm)进场及隔离
181	Moving in pen for integration (mixing, contact to boar) – acclimatization (weighing, measurement od sidefathickness混群、诱情、称重、体测
202	Moving in other pen (mixing, contact to boar) 混群、诱情
223	Mixing in groups, contact to boar (?) 批混群、诱情
239	Moving in single pen for synchronization of cycle 至定位栏、性同步化
244	Gilts come in heat (following of moving) 发情
249	Start of synchronization of estrus
266	End of synchronization of estrus
268	eCG
≥ 271	Detection of heat and AI 查情配种

烯丙孕素18 days

HOY: Gilts have to come in new farm early enough“....good acclimatization new pathogens

Maxim for using of biotechnical control of reproduction in sows:

利用生物技术控制母猪繁殖准则

Exogeneous support for physiological, endocrinological processes helps to save the onset of reproduction activities in time.生理和激素的外源性因素影响生殖活动

Hormones at the right physiological time, so much as necessary, so little as possible!

正确的生理阶段尽可能少量使用激素


Sows
经产母猪

Stimulation of estrus in weaned sows
断奶母猪刺激发情

Keep onset of estrus in time and synchronization of estrus in sows after weaning断奶母猪的及时和同步发情

Uncertainty factors for onset of estrus in weaned sows:断奶母猪发情的不确定因素

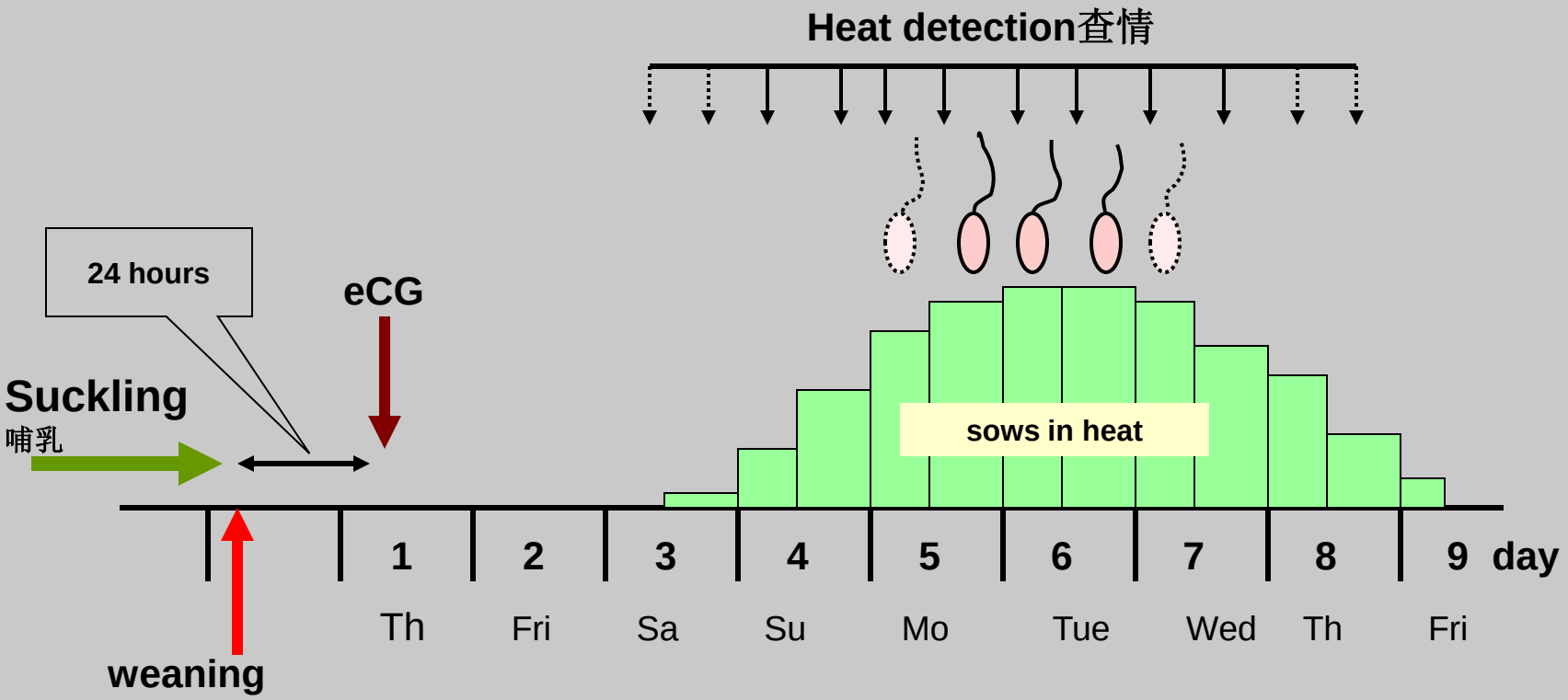
- High environmental temperature高温

-Onset of estrus in primiparous sows can be not sure

-初产母猪不能确定的发情

-High loss of body weight in previous lactation

-哺乳期体重损失



Stimulation of cycle 24 h after weaning断奶24小时后开始刺激:
primiparous sows初产母猪: 1000 IU eCG
pluriparous sows经产母猪: 800 IU eCG

⟹ sows in heat (4 - 6).....> 90 % 发情率> 90 %

Stimulation of cycle after weaning断奶后刺激


Gilts
后备母猪

Integration of gilts in farrowing system
后备母猪批次导入

Rhythm for management of herds猪群管理周期

7-days

Integration of gilts can be realized without biotechnical help不用生物技术处理.后备母猪能够导入
Gilts in heat will be introduced in weaned group of sows in each week.每周发情后备母猪导入断奶母猪群

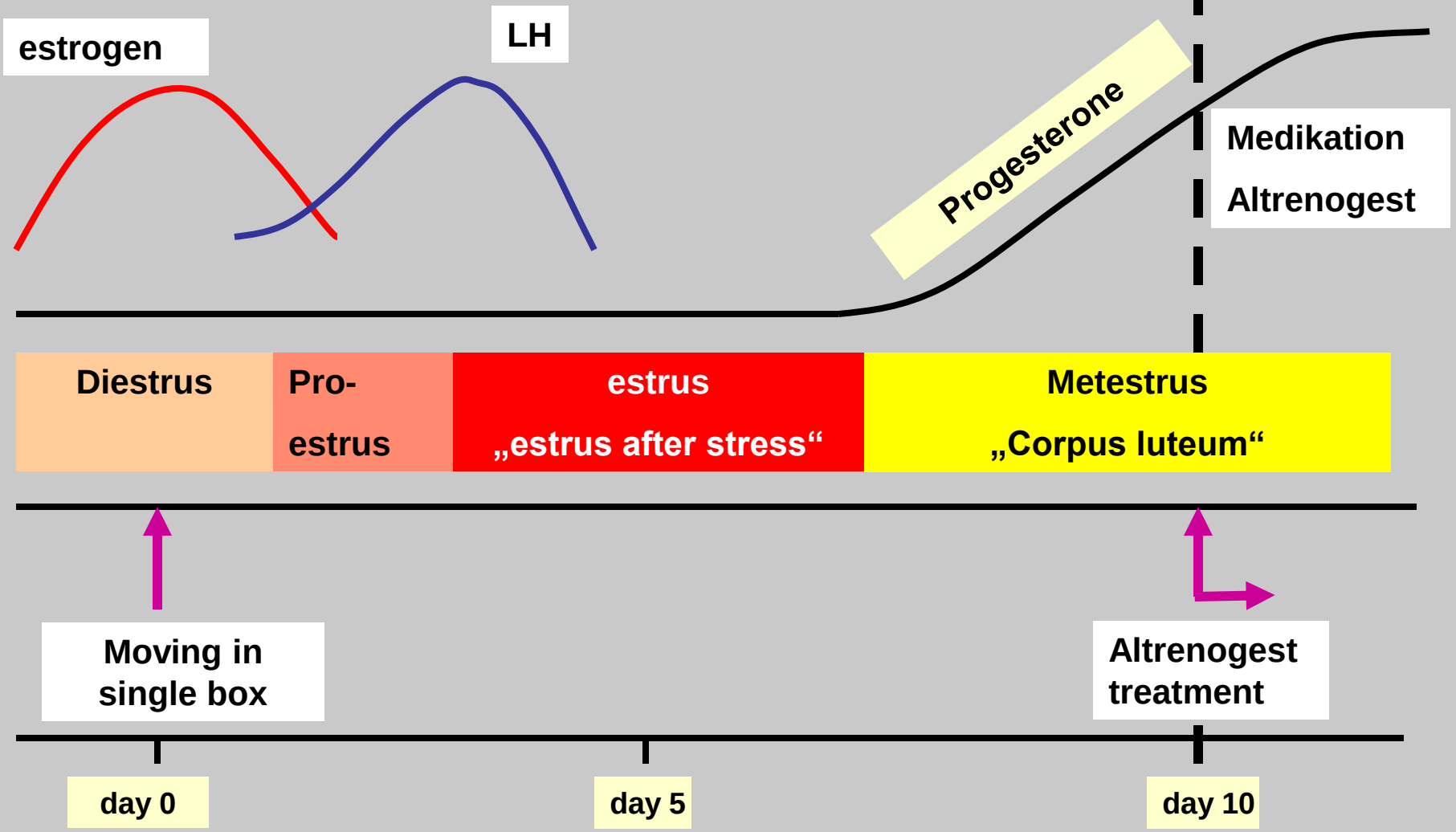
Problem: A constant number of gilts in heat is required each week!问题：要求每周发情的后备母猪数量不变

> 7-days (most 21-days)

Integration of gilts is hardly possible without biotechnical help!
不用生物技术处理.后备母猪不能导入
It is necessary to synchronize estrus of gilts with estrus of weaned sows!
后备母猪和经产母猪同期发情
Problem: Often different old gilts are purchased for remountation of herds!.. Purchasing in package!
问题：常常需购买不同日龄后备母猪

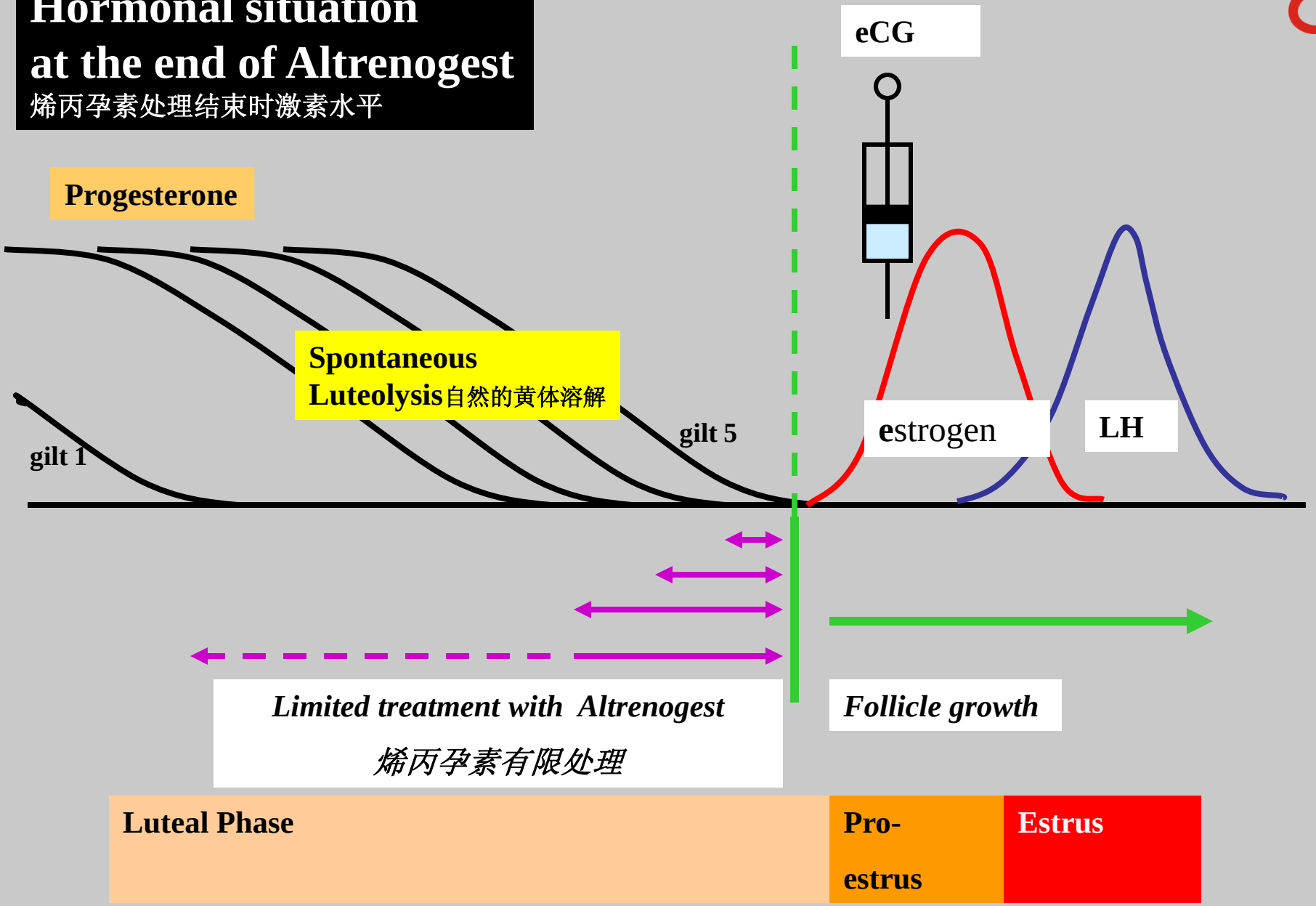
Hormonal situation at the beginning of Altrenogest

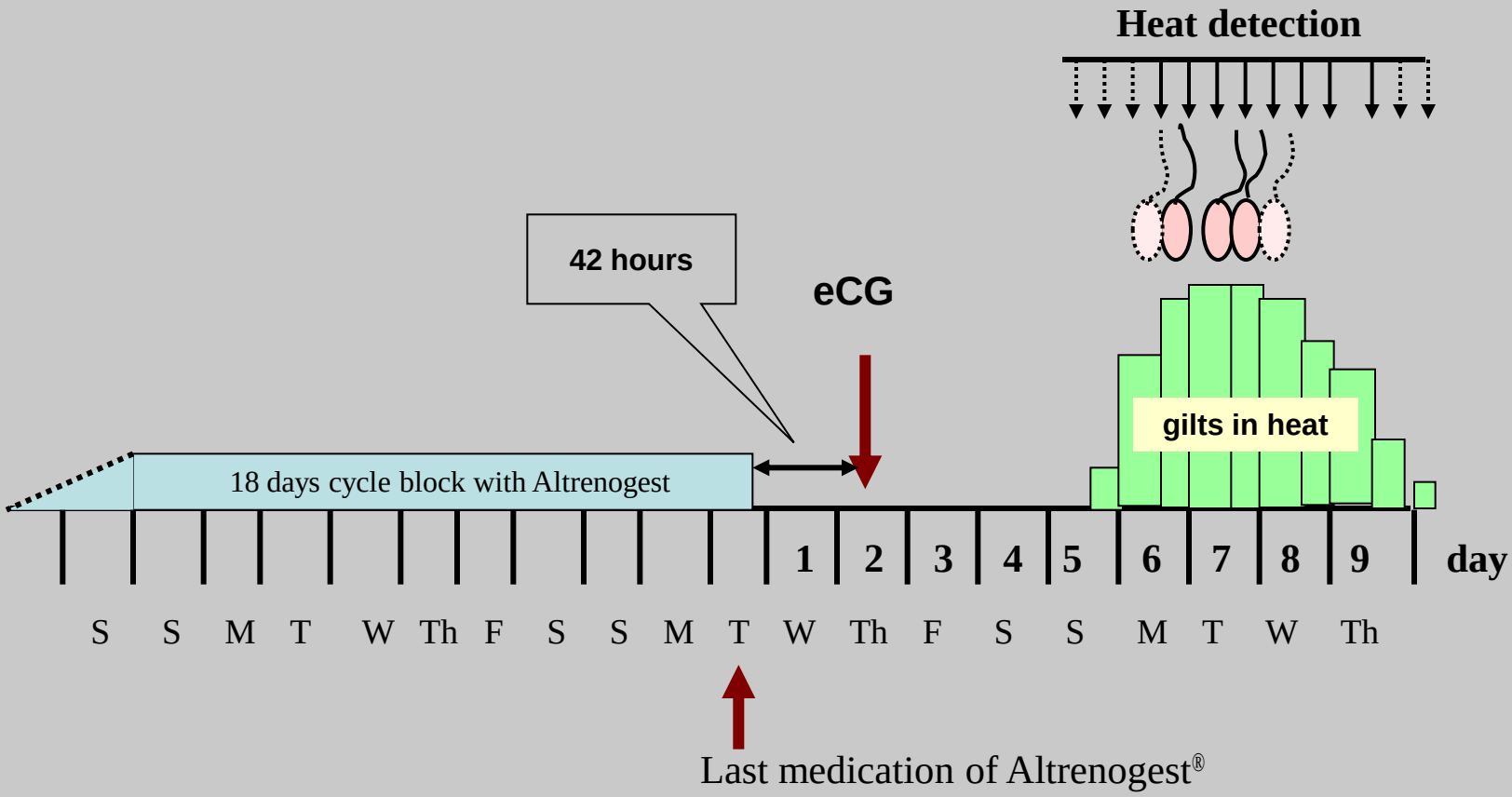
烯丙孕素处理开始的激素水平



Hormonal situation at the end of Altrenogest

烯丙孕素处理结束时激素水平





Stimulation of estrus 42 h after last medication of ALTRENOGEST® :
800 IU eCG (Pregmagon ®) 烯丙孕素最后一次处理后42小时刺激发情

→ gilts in heat (6-8).....> 90 % 发情率> 90 %

Syncronization of estrus in gilts and insemination after heat control
后备母猪同期发情和发情调控后配种

Effect of Altrenogest treatment on pregnancy rate, number of fetuses, ovulation rate at 48th day after AI*

烯丙孕素处理对妊娠率，胎儿数和配种后48天排卵率的影响

	Control	Altrenogest
No. Gilts	124	103
No. Corpora lutea	14,6 ± 0,3	15,4 ± 0,3
Pregnancy rate (%)	77,4	89,3
No. Fetuses (total)	10,6	11,1
Fetal survival rate 48d	64,9	64,9

* Martinat-Botte et al. (1995)

Advantages of Altrenogest
烯丙孕素处理优势

- Higher ovulation rate 多排卵
- Higher pregnancy rate高分娩率
- Higher litter size 多窝产仔

Number of AI per week before and after treatment with Altrenogest
(n. Thing et al., 2014)使用烯丙孕素前每周配种数

If gilts are synchronized by Altrenogest, the number of inseminated gilts is more and more constand in goup of sows.处理后经产和后备配种数更稳定

Advantages

- **better capacity utilization in stables**
- **fewer gilts for AI**
- **better planning security all over the year**

Reproduction performance in gilts depends on the synchronization

同期发情后备母猪的繁殖性能

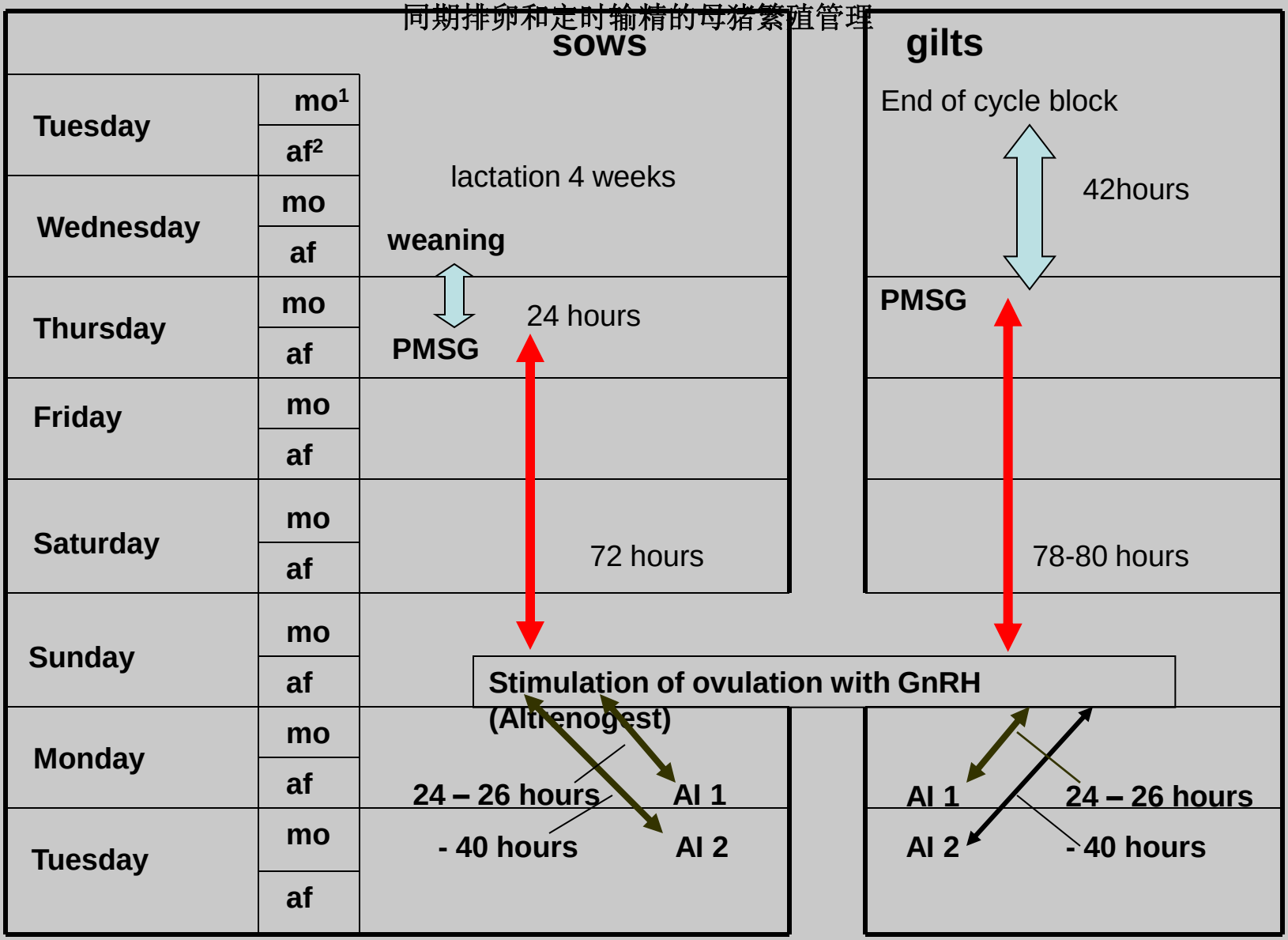
Group	n	Born total/litter	Born alive/litter	Born dead/litter
I Altrenogest	746	13,5 ± 2,3[a]	12,8 ± 3,1[a]	2,3 ± 1,6[a,c]
II No Altrenogest	357	13,6 ± 3,4[a]	12,6 ± 3,1[a]	2,0 ± 2,4[b,f]
III Altrenogest+eCG	3.177	14,6 ± 3,5[b]	13,3 ± 3,3[b]	2,3 ± 1,8[b,d]

I…08.2012 – 02.2013 ; II…03.2013 – 07.2013 ; III…08.2013

- More concentrated AI of gilts …..better integration in groups farrowing system
- 配种更集中
- Simpler and safer heat detection in gilts 查情简单可靠
- In few years in gilts a performance progress can be expected更好的表现
- The performance potential is exhausted.发挥潜能

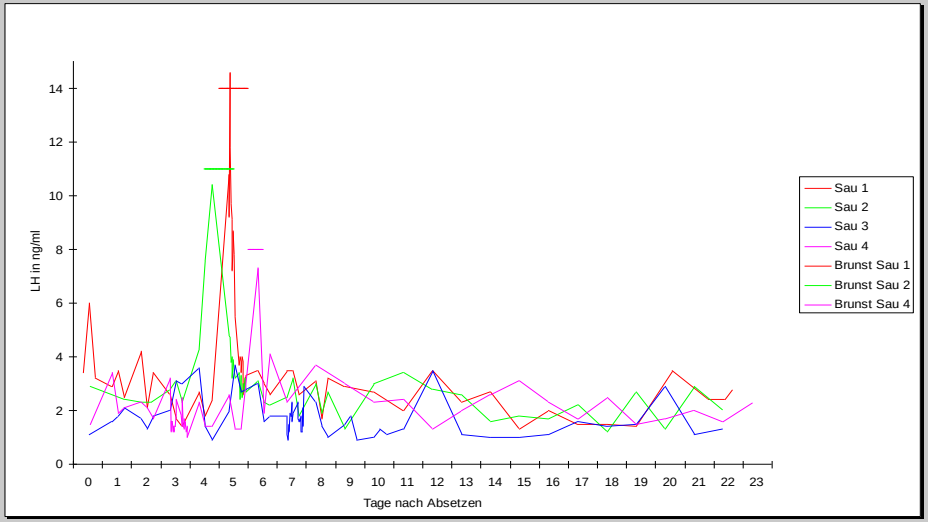
Management of reproduction in sows with synchronisation of ovulation and timed insemination

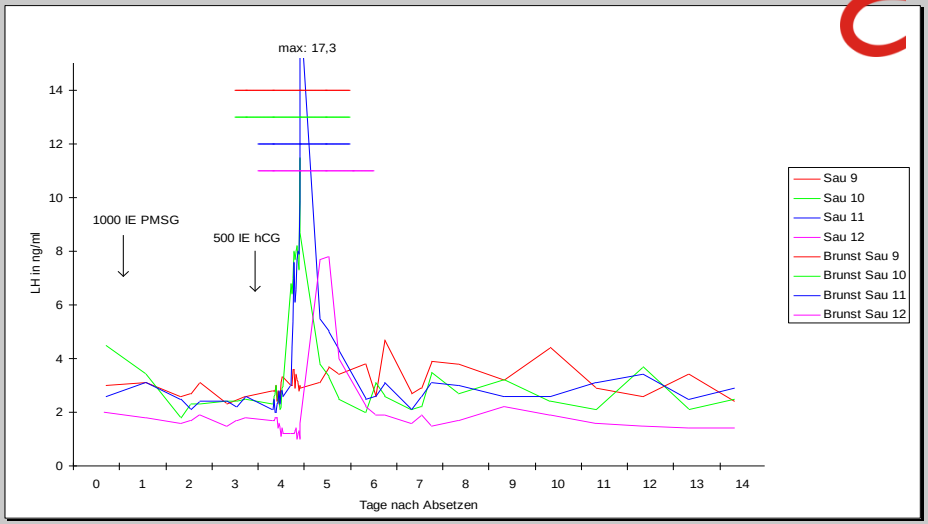
同期排卵和定时输精的母猪繁殖管理



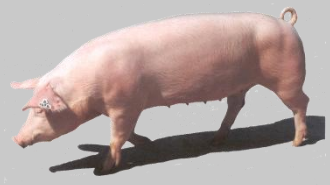
1...in the morning at 7.00 a.m.

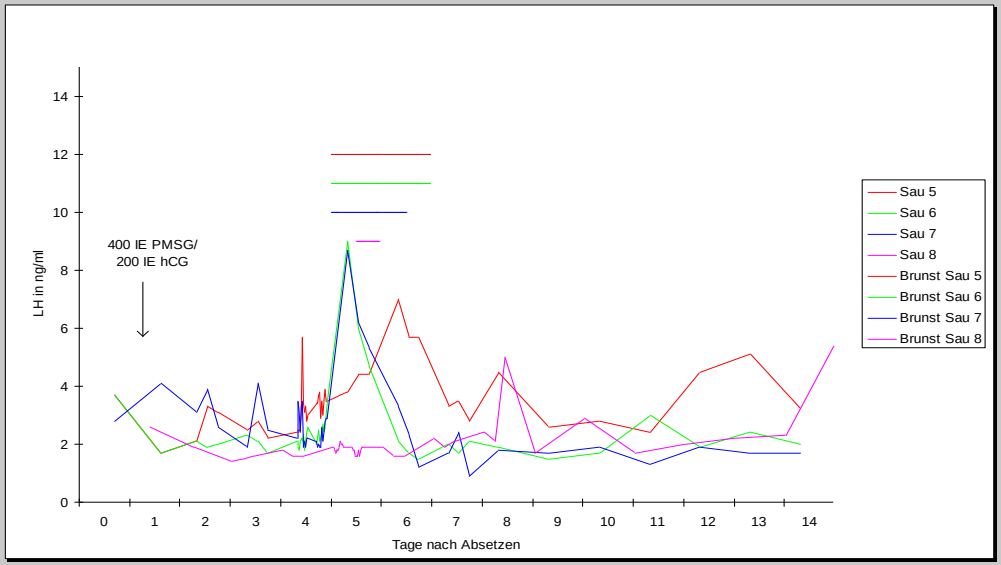
2.....afternoon at 3.00 p.m.





Without stimulation





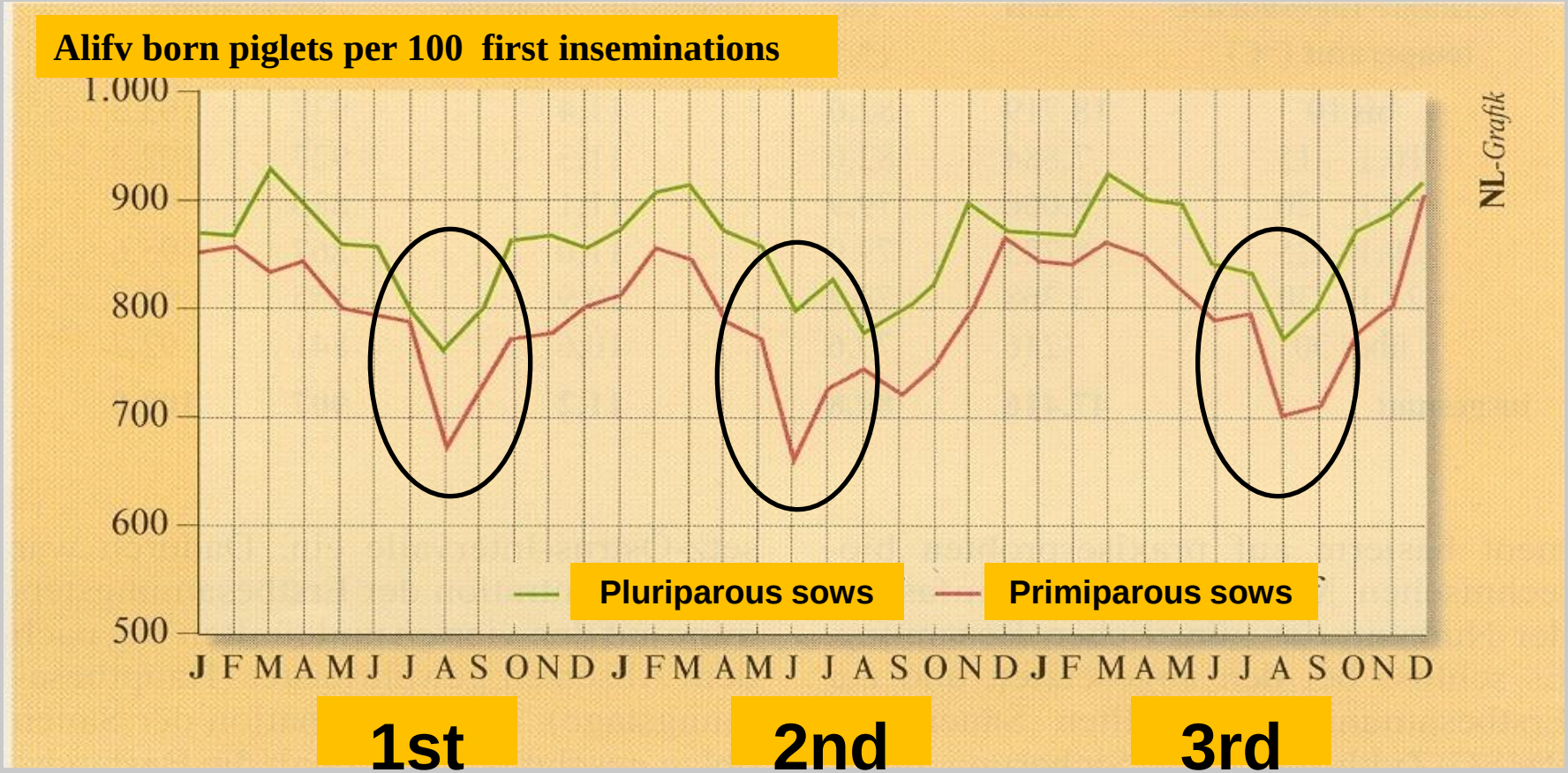
Cycle stimulation with 1000 IU PMSG

Cycle stimulation witht 400 IU PMSG/ 200 IU hCG

LH - conzentration in weaned primiparous sows after different biotechnical stimulation of cycle (BARBE 1996)

不同诱导发情方法对初产母猪LH分泌的影响

Saisonal variations in fertility in sows
季节变化对母猪繁殖力的影响



Consequences of high temperatures on fertility in sows高温对母猪繁殖能力的影响

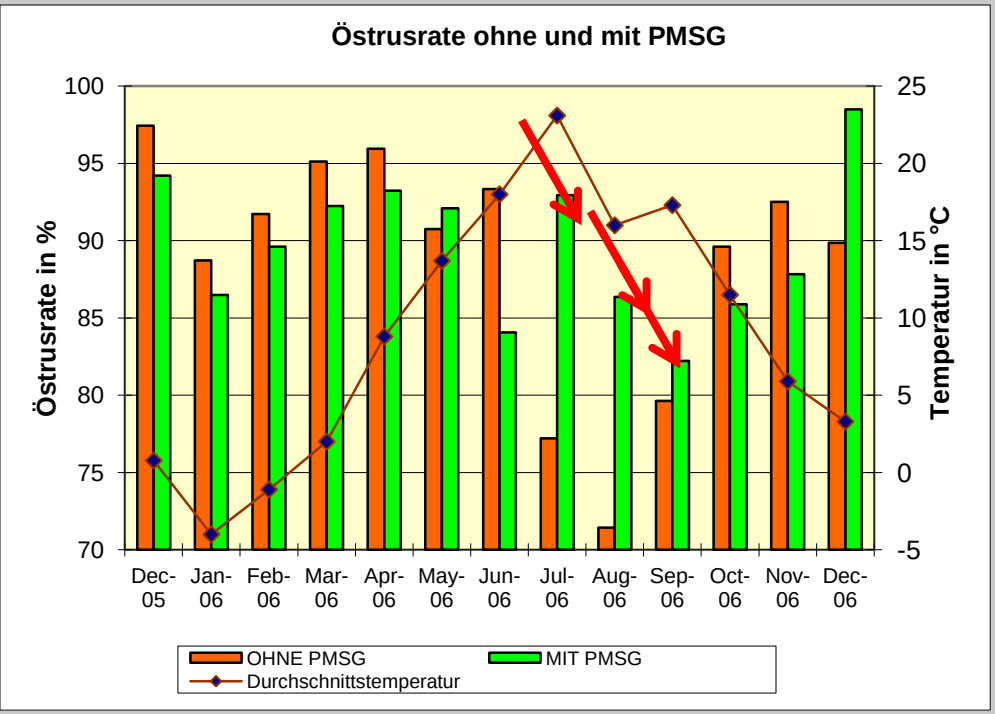
- Delayed onset of puberty 初情期推迟
- Change in estrous behaviour发情行为改变
  - increased percentage of late onset estrus迟发情增多
  - more sows with ancyclic return返情母猪增多
  - more sows without estrous behaviour不发情母猪增多
  - longer weaning – estrus- interval断奶发情间隔延长
- Reduced pregnancy rate妊娠率降低
- reduced litter size产仔数减少
- (sometimes!) more miscarriages and stillbirth (mummies)
- 流产和死产增加

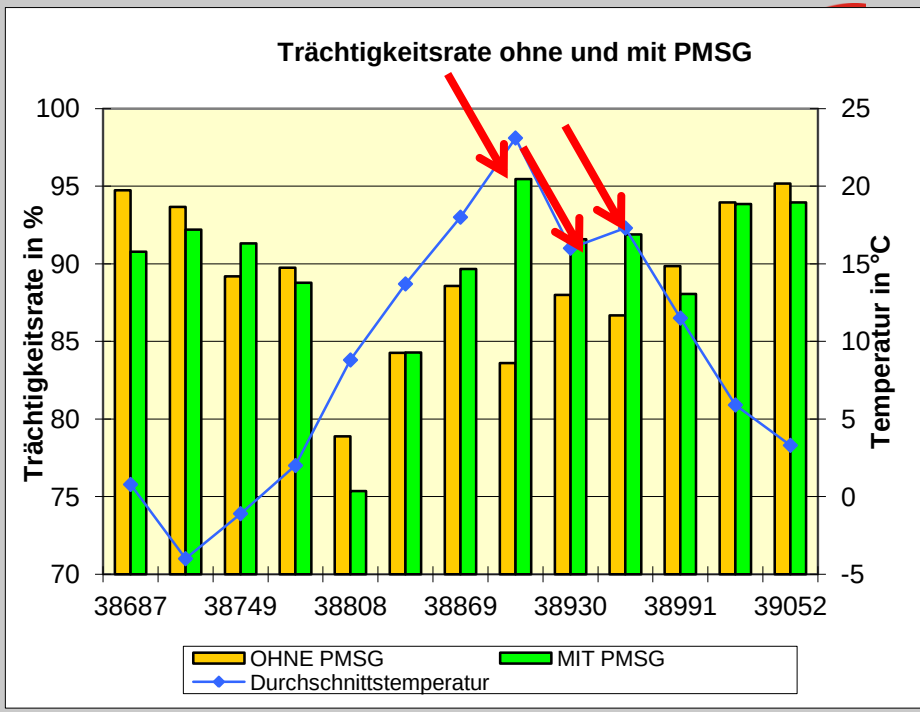
High variations in saisonal reproduction performances between farms !

Management against saisonal reduced reproduction performance
针对季节性繁殖水平下降的管理方法

- Analysis of standing behaviour and reproduction performance is the basis for calculation of variations
- 分析静立发情表现和繁殖性状是预测变化的基础
- Analysis of important influences like:
  分析重要的影响因子，例如：
  - body weight 体重
  - body condition体况
  - climatic situation in stable气候状况
  - Water and feed水质和饲料
-

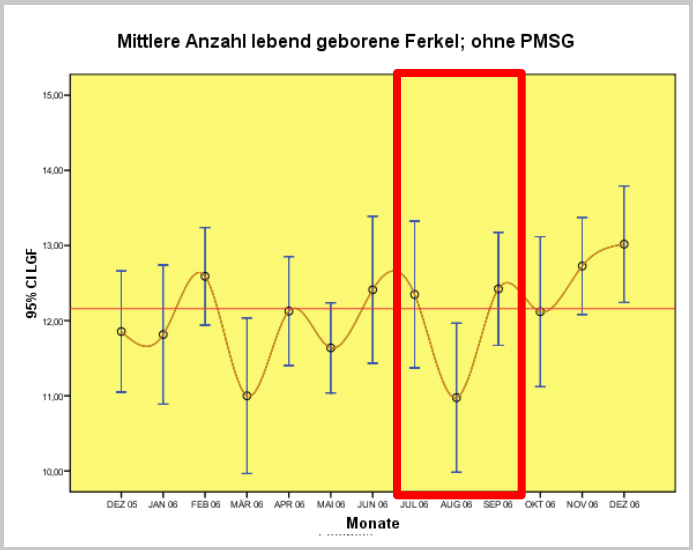
- Always measurments of temperature in stables
  ⟹ coling, ventilation, moisten
  监控气温度变化-----降温、通风、湿度
- **Correct treatment of biotechnical methods for synchronization of estrus.**
  正确的发情同步化的处理
- **Intendification of heat detection with clear documentation ⟹ modification of times for AI**
  发情鉴定和人工授精时间的修正





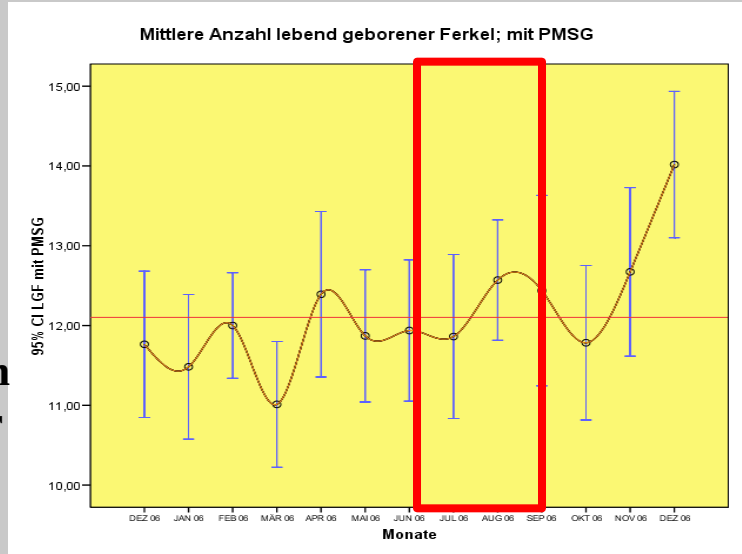
Sows in heat (%): 800 IU PMSG: 89,80
without PMSG: 88,56

Pregnancy rate (%): 800 IU PMSG:89,53
without PMSG: 88,85



12,07 born alive /litter

12,15 born alive/litter



Number of piglets born per 100 inseminations at 1st service according to the season and the age of the sow as a function of stimulation of cycle

不同季节使用PMSG

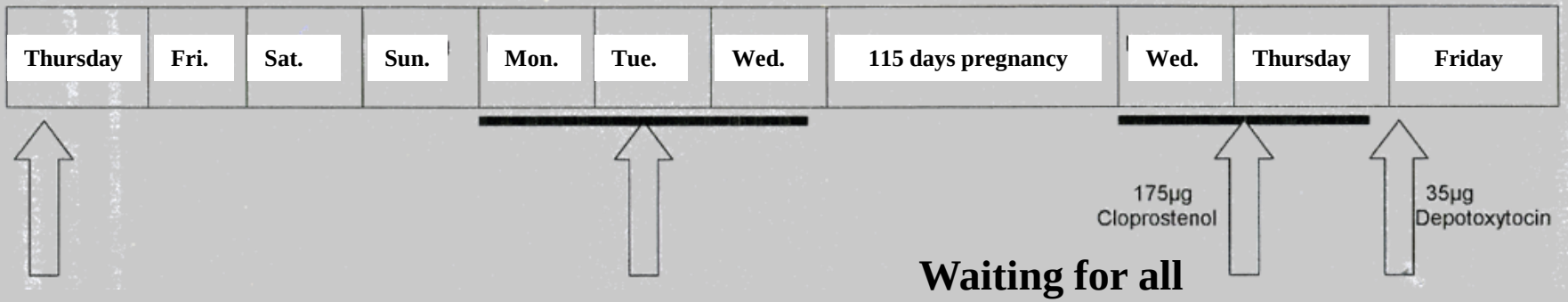
对产仔数/100次配种的影响

litter	winter		spring		summer		autum	
	Contr.	eCG	Contr.	eCG	Contr.	eCG	Contr.	eCG
2	1099	855	806	820	862	1072*	1013	1088
3–5	1081	1078	1040	946	1009	1131	1183	1118
> 5	958	936	960	788	850	997*	942	948

* $p<0.05$

分娩管理Management of birth

Group farrowing system with biotechnical control
分娩批次化控制技术



Weaning of groups of sows in system

Concentration of onsets of heat and AI-times

Waiting for all spontaneous farrowing until day 114/115 of pregnancy

Induction of birth only in sows with longer pregnant time with $PGF_{2\alpha}$.

More concentration of times for farrowing

⬇

Weekends without farrowing

Preparation for Synchronization of birth
同期分娩的药品

Prostaglandin F 2α 前列腺素F 2α

synthetical Analoga with substance Cloprostenol
合成类似物氯前列醇

最佳剂量**Optimum for dosage: 175 – 100 µg/Tier**

↓

- Regression of Corpora lutea (C.l.) 黄体退化

-Stimulation of contraction of myometrium (with Oxytocin)刺激子宫收缩

Points for calculation of pregnancy and parturition in sows
母猪妊娠和分娩的计算要点

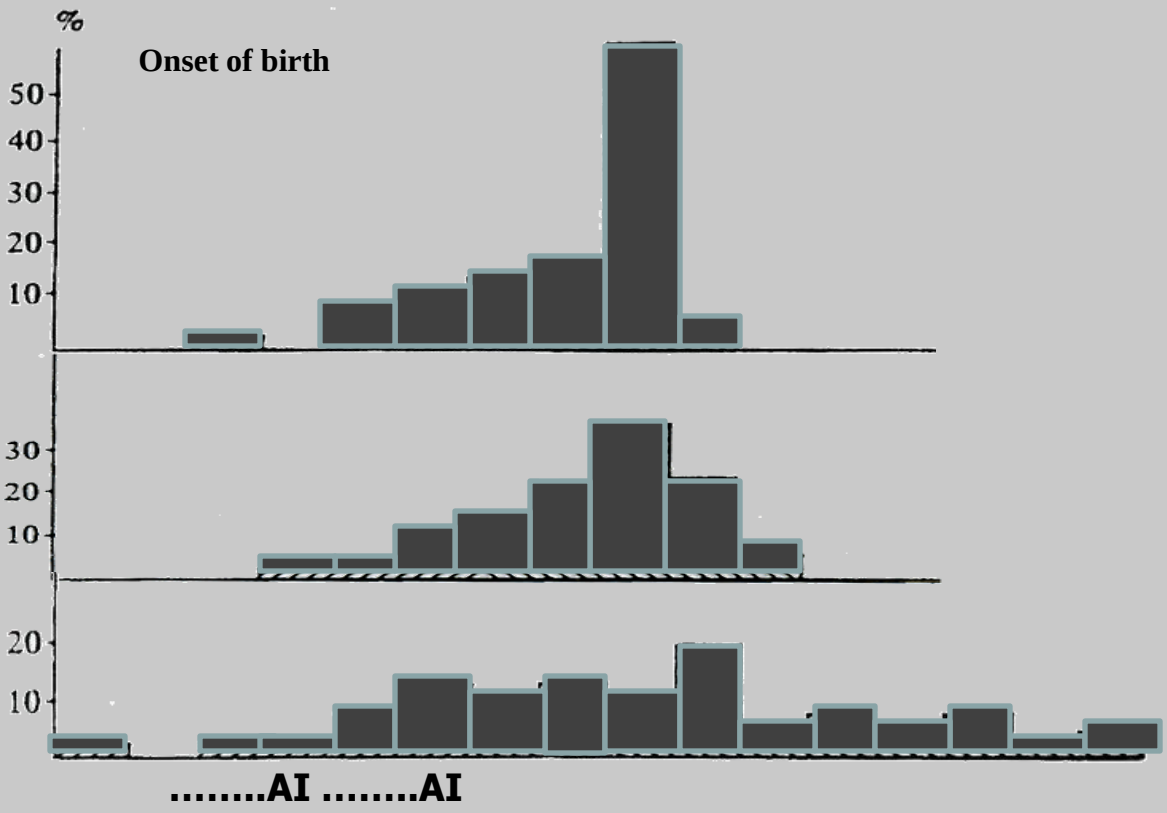
		Days of week for calculation of pregnancy 孕期计算周天数					
AI1	AI2	113	114	115	116	117	118
Thursday	Friday	Fr	Sa	So	Mo	Tue	Mi
Friday	Saturday	Sa	So	Mo	Tue	We	Thu

Time for PGF 2α - Injektion: 注射时间

sows..... (113.) 114. day of pregnancy

gilts.....114. day of pregnancy

AI1… day 0 of pregnancy
AI2 …day 1 of pregnancy



…after combined treatment for induction of birth with $PGF_{2\alpha}$ + Depotoxytocin 结合诱导分娩

n=239

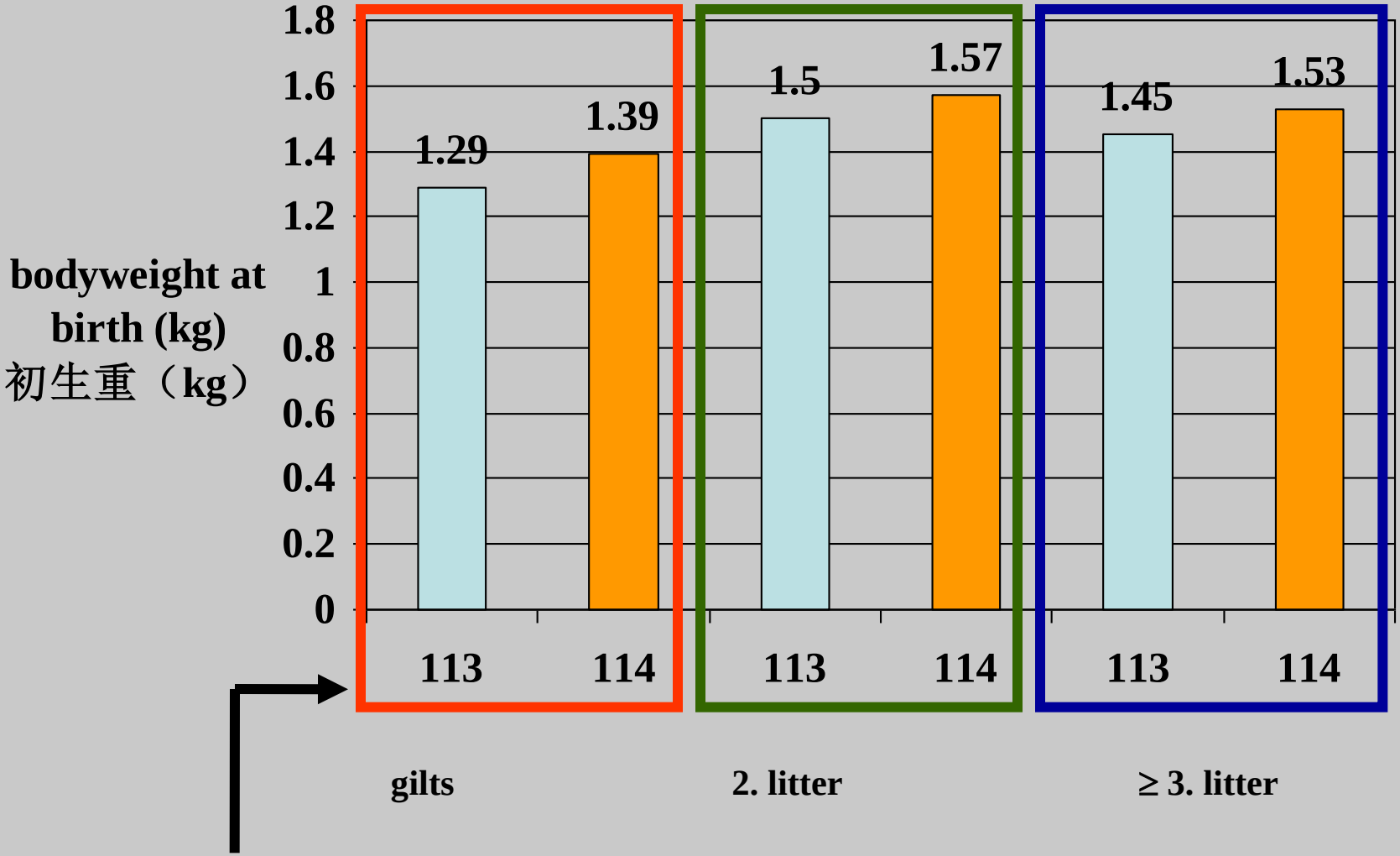
…after induction of birth with $PGF_{2\alpha}$ 诱导分娩

n=407

no induction of birth不诱导

n=308

High concentration of farrowings after treatment with $PGF_{2\alpha}$ and Depot-Oxytocin两者处理诱导分娩集中度高



AI_1 = 0. day of pregnancy
AI_2 = 1. day of pregnancy

Notes for synchronization of parturition!

同步分娩的要点

Time for PGF $_{2\alpha}$ – Injection is perfect when 40 to 50% of sows in group have begun with birth spontaneously

猪群自然分娩40-50%时注射PGF $_{2\alpha}$

The success for synchronization is most important. After intramuscularly injection of Cloprostenol-preparation about 95% of births will be in next 36 hours.

同步分娩成功很重要。肌注氯前列醇95%的会在36小时内分娩

Importance of normal duration of birth for production:

分娩持续时间短的重要性

Time for piglet delivery for uniform litters 产仔一致性
Ensuring similar weaning period for all sows within a group 母猪断奶一致

For sow: 对母猪而言

Less stress，减少应激

Reduced problems in puerperium

Positive influences:减少围产期疾病

- ➡ **less MMA减少围产期综合症**
- ➡ **better following estrus**

利于发情

For piglets:

- ➡ **less stress during birth减少仔猪应激**
- ➡ **Reduced stillbirth, less animal losses, less piglets with low vitality减少死胎、弱仔**
- ➡ **More uniform and health piglets in litter and in all litters in group of sows增加仔猪的均一性**

➢ What kinds of benefits with group farrowing system and biotehnical methods?批次化管理和生物技术方法有什么优点？

1.) Benefits for production:对生产的效益

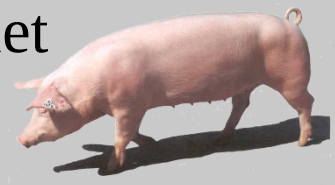
- Better quality in daily work更好的工作效率
- Better management for hygiene and health更好的卫生和健康管理
- Better management for AI更好的人工授精管理
- Better management in farrowing time更好产仔时间管理
- Optimzed piglet rearing最佳的仔猪寄养管理

2.) Benefits for economics:对经济的好处

- Low cost for manpower and work降低人力和工作成本
- Low costs for health management减少健康管理成本
- Cost savings for AI-management节省AI管理成本
- Low costs for enegery减少能原支出
- Low er fixed costs减少固定成本支出
- Higher sale proceeds for each piglet更高的每一仔猪销售收入
- Higher sale proceeds for group of piglets with uniform age , body weight and health status.一致的日龄、体重、健康状

Take home message:

- Biotechnical synchronization of estrus in gilts and weaned sows is the basic for effective group farrowing system in piglet production.性周期同步化是母猪生产批次化管理的基础
- It helps to realize higher reproduction performances in sows with higher business profit.有助于认识到母猪生殖性能越高经济效益越高
- It helps to reduce saisonal degressive variations in reproduction performance in sows.母猪生产批次化管理能减少母猪生产的波动（人为或季节性）
- Synchronization of parturition is the basis for optimized labor input and for perfect group farrowing system in piglet production.同步分娩是批次化生产可减少劳动力 需要



Thank you very much for attention!