

遵照德国联邦议院的决议，由



联邦
食品和
农业部

资助



中德畜牧业技术创新中心

Sino-German Centre for Technology and

Innovation in Animal Breeding

中德畜牧业合作项目

Cooperation Project on Animal Breeding and

Husbandry in China

中德猪业发展合作项目

Sino-German Cooperation on pig husbandry

Sow Reproduction Management

母猪生产批次化管理

技术手册



全国畜牧总站
中国饲料工业协会

遵照德国联邦议院的决议，由



Author

Henrik Delfs

ADT Project Consulting GmbH

Dr. Kerstin Tina Hamann, Dr. Jörg Krapoth, Dr. Ulrich Presuhn

German Farm Consulting GmbH & Co. KG. – info@farm-concepts.de



 **German Farm Consulting**

Translated by

Guo Fengjuan

Henan Yifa Animal Husbandry Co., LTD.

Proof-reading

Sun Qilong, Medal China Co., LTD.



First edition, August 2020

Published by

ADT Project Consulting GmbH

Adenauerallee 174, 53113 Bonn, Germany

NAHS

National Animal Husbandry Service, Building No.20, Maizidian Street, Chaoyang District, Beijing, China 100125

Edited by

Dr. Ferdinand Schmitt, team leader ADT Project Consulting GmbH

Dr. Qiu Xiaotian, Dr. Duan Zhongyi, Du Wei, Dr. Liu Chousheng,

National Animal Husbandry Service

© All rights reserved.

for

“Sino – German Cooperation Project on Animal Breeding and Husbandry in China” (CHN 18-02), funded by the Federal Ministry for Food and Agriculture and supported by the Ministry of Agriculture of the People’s Republic of China.

For further information on the project please access:

www.adt-tierzucht-china.org or www.adt-schweinezucht-china.org

With support from



Biq Dutchman



SEPARATOR
A BAUER Group company



遵照德国联邦议院的决议，由



作者

Henrik Delfs 德国 ADT 国际项目管理与咨询公司

Dr. Kerstin Tina Hamann, Dr. Jörg Krapoth, Dr. Ulrich Presuhn



德国 German Farm Consulting GmbH & Co. KG. 公司

邮箱 info@farm-concepts.de

翻译

郭丰娟 河南省谊发牧业有限责任公司

校对

孙其龙 北京 / 青岛牧道天成科技有限公司



2020 年 8 月第一版

出版单位：

德国 ADT 国际项目管理与咨询公司

Adenauerallee 174

53113 Bonn, Germany

全国畜牧总站

北京朝阳区麦子店街 20 号楼

编辑

费迪南特施密特，中德畜牧业合作项目负责人，德国 ADT 国际项目管理与咨询公司

邱小田、段忠意、杜伟、刘丑生，全国畜牧总站

© All rights reserved 版权所有

“中德畜牧业合作项目”（CHN 18-02）由德意志联邦共和国食品和农业部资助并由中华人民共和国农业农村部合作执行。有关本项目的详情，请浏览：

www.adt-tierzucht-china.org 或 www.adt-schweinezucht-china.org

项目由以下德国项目企业参与执行：



Big Dutchman



SEPARATOR
A BAUER Group company





目 录 Content

1 Introduction 引言.....	2
2 Batch Management as a base for.....	4
2.1 Basic knowledge 基础认知.....	5
2.2 Batch Management overview 批次管理概况.....	8
3 Weaning of sows 经产母猪断奶.....	13
4 Introduction of gilts 后备母猪入群.....	14
4.1 Gilts from own production 自繁后备母猪入群.....	17
4.2 Introducing gilts from another farm 外来后备母猪引种.....	18
4.3 Planning the introduction of gilts 后备母猪入群规划.....	19
5 Insemination 配种.....	21
5.1 Optimal timing for insemination 最佳配种时间.....	24
5.2 Insemination Monitoring 配种监测.....	26
5.3 Artificial Insemination - step by step 人工授精操作步骤.....	30
6 After A.I. until farrowing 配种后至分娩管理.....	38

Sow Reproduction Management

母猪生产批次化管理 技术手册





1 Introduction 引言

For a piglet producer, the success lies in the number of piglets sold and their production costs, and not the number of live-born piglets per sow.

对仔猪生产场来说，生产成绩的标杆是卖出仔猪的数量以及生产成本的控制，而不是每头母猪的活产仔数。

We therefore prefer a largely autonomously farrowing sow with a pronounced motherliness, a minimum number of 16 functional teats and an improved piglet quality due to balanced birth weights.

因此，猪场更希望获得能够独立分娩，并有显著母性特征的母猪，这种母猪最少要有 16 个有效乳头，能够生产体重均衡的仔猪，以提高仔猪的整体质量。

For an optimal success, it is necessary to the work in the stables in a structured manner.

为了取得最佳的生产成果，必须对圈舍工作进行有效规划。



An important point is the synchronization of the herd in groups. This is the only way to work in a structured manner. Only this allows the piglet rearing and fattening in an „all in – all out”management system which allows optimal hygiene measures.

同期发情是批次化生产中最根本的一点，唯有如此，才能实现仔猪保育和育肥阶段的全进全出模式，才能确保最佳的生物安全环境，从而获得最大生产效益。

Consistent operational management in the weekly production system also enables problem-free farrowing with large litters; the optimal and uniform rearing of the piglets is a central goal - inhomogeneous litters are avoided. The work is structured and better.

统一、持续和有效的管理在批次化生产中必不可少，可以确保即使在窝产仔数大的情况下也可以顺利完成分娩。中心目标是要避免窝产仔猪质量差异过大，以便取得理想和均衡的仔猪保育成果。批次化生产可以明晰生产流程，提高生产效率和效益。

It is important: Only healthy sows can achieve high performance, which is also reflected in their offspring - in high-quality, happy breeding and fattening piglets.

但前提是只有健康的母猪才能带来高效益，这也会反映在母猪后代的性能上，即产出高质量、生长发育良好的后备种猪和育肥仔猪。



2 Batch Management as a base for successful production

批次化生产 - 成功的基石

The consistent organization of the company with a production rhythm is mandatory in almost all companies today. First of all, this is controlled by weaning of the sows. But it also includes the targeted integration of the gilts.

如今，批次化生产已成为组织运营猪场必不可少的生产方式，几乎所有猪场都在采取此方式进行统一管理。批次化生产方式的起点是断奶，同时必须关注后备母猪入群时的同期发情处理。

Service time inside the stables - the all in-all out process for individual production sections

enables management to carry out necessary hygiene measures. This will also improve the health of breeding sows and piglets.

在每个生产环节，圈舍中都要采用全进全出的方式，既可确保优异的生物卫生状况，又有助于提高母猪和仔猪的健康。



Birth monitoring can be more consistently performed in group farrowings.

批次化生产有助于同批次母猪分娩时进行统一有效的分娩检查。

Systematic and quick litter adjustments can be made in this way from the first day of life, but only after colostrum intake- after 6 hours up to a maximum of 48 hours.

仔猪出生并确保仔猪喝完初乳后 6 小时（最多不超过 48 小时）可以系统、快速的均匀分配窝产仔猪。

Especially in smaller farms, multi-week batch management systems lead to adequately dimensioned piglet quotas that can be marketed more effectively. For example, a pig truck in Europe can load 650 piglets.

尤其是小型猪场，借助多周批次生产可以有效调整仔猪销售群组，更有利于扩大销售收入。比如，在欧洲一辆仔猪运输车同批会装载 650 头仔猪。

2.1 Basic knowledge 基础认知

21 is the magic number in understanding the swine reproduction



management.

“21” 是了解猪场繁殖管理的神奇数字。

◆ The gestation period of a sow are 115 days

母猪孕期 115 天

◆ The lactation-period is < 28 days

哺乳期小于 28 天

◆ Service interval are 5 days

断奶到配种间隔 5 天

◆ That makes < 148 days = 21 weeks

由此可以得出，周期 <148 天，即 21 周

◆ With weaning after 3 weeks that makes 20 weeks (<141 days).

如果采取 3 周断奶方式的话，则生产周期为 20 周 (<141 天)



Groups of productive sows 批次群组

Requirements 前提：

The group size must match the individual circumstances of the sow farm. It depends on:

批次群组的大小必须符合猪场自身情况，取决于：

- ◇ Herd size, 猪场存栏规模
- ◇ the structural conditions, 猪场设计建造
- ◇ the farrowing equipment, 分娩栏设置
- ◇ the piglet-rearing compartments, 保育舍设计建造
- ◇ as well as the farm's organization of work. 猪场的工作组织安排

This results in a special rhythm that must be adhered to throughout.

据此综合考虑，必须制定符合猪场自身特点的批次化生产周期，并且必须确保自始至终贯彻落实。



2.2 Batch Management overview 批次管理概况

Table 1: Different batch management systems (Source: GFC; 2018)

表 1：不同的批次管理方式（来源：德国农场咨询有限责任公司，2018）

Weaning 断奶周龄 (weeks 周)	Cycle 周期 (weeks 周)	Possible combinations 可能的组合 (groups * weeks 批次 * 周)	Usage of farrowing compartments 产房使用期 (weeks 周)	Required rooms 需要的圈舍数量
3	20	4*5	5 (4)	1
		5*4		2
		10*2		3
		20*1		5
4	21	3*7	6 (5)	1
		7*3		2
		21*1		6
6 (organic 生态养殖)	23	7*3	8	3
7 (organic 生态养殖)	24	8*3	9	3
8 (organic 生态养殖)	25	5*5	10	2



3-week batch management 3 周批次流程：

The 3-week batch management is optimal for smaller sow farms to get bigger sow groups and higher numbers of piglets for sale to reduce costs for work and transportation.

对于规模较小的猪场来说，3 周批次管理是最佳选择，可以获得更大的母猪群组 and 单批更多的销售仔猪，可以相应减少工作和运输成本。

The sows are synchronised in 7 sow groups and weaned every 3 weeks.

可采用 7 个母猪群组同期发情处理，3 周断奶。

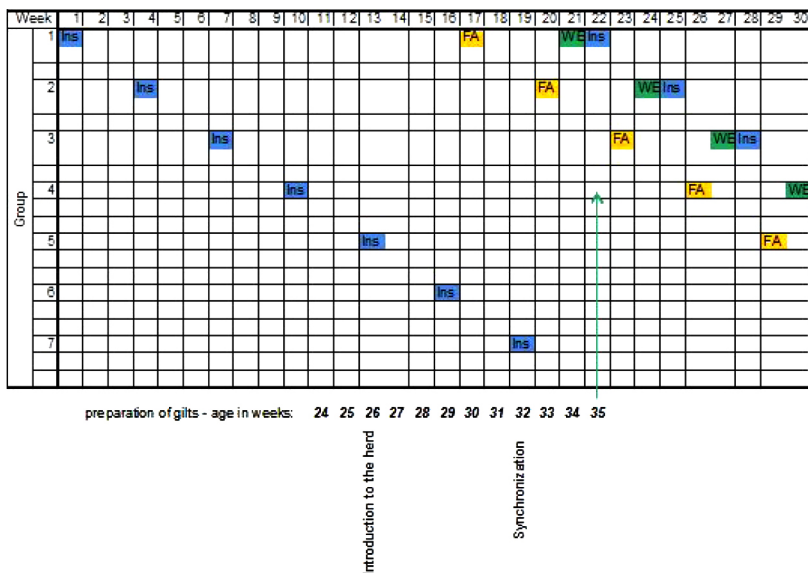


Figure 1: 3-week rhythm, 4 weeks weaning (Source: GFC; 2018)

图 1：3 周批次，4 周断奶（来源：德国农场咨询有限责任公司 2018）

1-week batch management: 1 周批次生产流程

◆ Synchronisation of the 21 groups at weaning. The milk flow should stop after 24 hours.

21 个母猪群组同期发情处理，从断奶开始。仔猪断奶后，母猪应在 24 小时之内停奶。

◆ Only if the milk flow has stopped a new cycle begins.



只有停奶后，母猪的发情周期才会重新开始。

◆ **ATTENTION!** If you wean too many piglets during the last week of lactation a new cycle can start already.

注意！哺乳期最后一周，如果同批断奶仔猪过多，则部分母猪会提前开始发情。

◆ After 3 weeks the heat control for signs of heat is done with a boar. 90% of the sows coming back into heat can be found, rearranged into the current sow group and inseminated immediately.

三周后用公猪进行返情检查。此时，90% 的返情母猪可被查出，将返情母猪转入届时新的配种群组，并立刻进行配种。

◆ After 4 weeks the ultrasonic test is carried out. The few sows not pregnant are inseminated after 2 weeks when they show signs of heat again.

4 周后进行 B 超检查。少数没有怀孕的母猪在后续两周发情时进行配种。

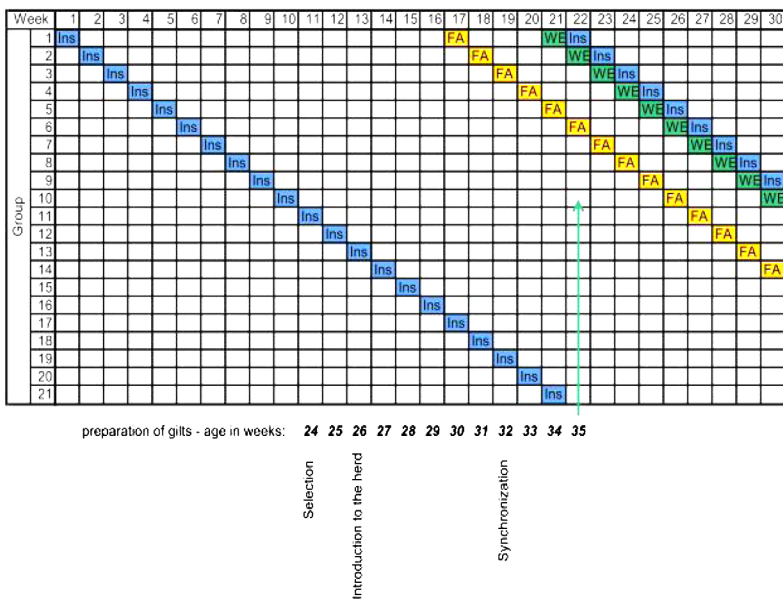


Figure 2: One-week rhythm, 4 weeks weaning (Source: GFC; 2018)

图 2：1 周批次，4 周断奶（来源：德国农场咨询有限责任公司 2018）



3 Weaning of sows 经产母猪断奶

◆ The whole group of old sows is weaned together and transferred to the mating area.

统一断奶后转入配种舍。

◆ The sows are stalled according to litter number and body condition→No thin sow beside a big one!

根据母猪的胎次和体况进行栏位调整 → 较瘦和较胖母猪不能同群！

◆ The group stays together→pregnant and empty sows shouldn't be mixed.

体况接近的母猪同群饲养 → 怀孕和待配母猪不能混养。

◆ At the weaning day the sows get no feed in the morning, but water should always be available.

断奶当天早上不要饲喂母猪，但是要提供充足饮水。



◆ The first feeding time is in the afternoon with energy-rich feed ("Flushing feeding").

下午进行第一次饲喂，宜用高能量饲料

(即“Flushing Feeding”)。

4 Introduction of gilts 后备母猪入群

Gilts introduced in the sow herd must have the same or higher health status as the old sows, to which they are introduced. The target is to match the health status of gilts and the sow herd. If they haven't the same immune/ health status it can cause several costly problems because of possible disease introduction into the sow herd by the gilts. Quarantine must be at least 8-12 weeks to ensure that gilts are free from disease. Gilts should be vaccinated in good time before their introduction into the sow herd. Even though replacement gilts are produced in the same herd as the old sows, a quarantine period for replacement gilts should also be done and a gilt introduction plan for the farm should be developed and introduced. (Figure 3).



Weeks	1 ^a (1 a 7 days)	2 ^a (8 a 14 days)	3 ^a (15 a 21 days)	4 ^a (22 a 28 days)	5 ^a (29 a 35 days)	6 ^a (36 a 42 days)
	1 2 3 4 5 6 7 8 9 0 1 2 3 4 5	1 1 1 1 1 1 0 1 2 3 4 5	1 1 6 7 2 2	1 1 2 2 2 2 2 2 8 9 0 1 2 3 4 5	2 2 7 8 2 2	2 3 3 3 3 3 3 3 9 0 1 2 3 4 5 6 7 8 9 0 1 2
Observation period						
Vaccinal Programm						
Programa Terapeutico*						
progressive contamination						
Stimulate the reproduction and progestagene period						

图 3：成功隔离的标准（来源：德国农场咨询有限责任公司 2018）



Observation period；观察期

Vaccinal Programm；疫苗程序

Programa Terapeutico；治疗程序

Progressive Contamination；主动感染 / 自然感染

Stimulate the reproduction and progestagene period；刺激生殖和孕激素使用期

For progressive contamination as mentioned in Figure 3 different materials can be used so that the gilts get in contact with the existing diseases of the sow herd. There are different materials available to challenge the immune system of the gilts with existing diseases of the sow herd, they have to be introduced (Figure 4).

针对图 3 中所提及的主动感染 / 自然感染，可以使用不同的物料予以落实，主动让后备母猪接触原母猪群中已有的病原菌群（这些物料如图 4 所列），以便使后备母猪的免疫力能尽快适应新群组的菌体环境。



选择适合的物料落实主动感染 / 自然感染

粪 便 尿 液 唾 液 鼻 液 分泌物 木乃伊	— Choice the appropriate materials									
	MYCO	GRIPPE	SDRP	PCV2	PARVO	STREPT O	APP	COL/ CLOSTR	LEPTO	
	FAECES			++	++	++			++	+
	URINE								+	++
	SALIVA, nasal secrétions	++	+++	++	+		++	+++		
MUMMYFIED S			+	+	+					++

Figure 4: Different materials for gilt adaptation (Source: GFC; 2018)

图 4：适用后备母猪主动 / 自然感染的不同物料（来源：德国农场咨询有限责任公司 2018）

4.1 Gilts from own production 自繁后备母猪入群

When introducing gilts from own production, the animals should have met the different pathogens already in the farm and the risk of them introducing new diseases are low. It is, however, important that they also follow the vaccination scheme that is necessary for the farm-known germs, because the accomplished immunity will not last until and after the gilts have been introduced into the sow farm.

当后备母猪是本场自繁留种母猪时，母猪就已携带本场不同的病原体，即传入新疾病的风险很低。但重要的是，仍然必须对



这些母猪贯彻执行本场已知病原体的疫苗免疫计划，因为后备母猪入群前后已具备的免疫力不会持续保持。

4.2 Introducing gilts from another farm 外来后备母猪引种

When buying gilts from an external supplier, the focus on health status and immunity is very important. Partner farms with the same or a higher health status must be chosen to avoid the risk of introducing new diseases to the sow herd. For this purpose, the health status of the gilts should be examined before the transfer of the animal to make sure that no diseases are introduced to the sow herd. Always make sure, that the health and vaccination history can be followed up.

当从别的猪场购买后备母猪引种时，必须关注母猪的健康状况和免疫力，必须选择种群健康度不低于本场的供种合作猪场，以避免传入新疾病。为此，在猪只运出种源猪场前，必须检测后备母猪的健康状态，而且必须确保可以追溯后备母猪的健康信息和疫苗接种记录。

◆ A complete heat control and its documentation (1st / 2nd /3rd heat) is very important, especially during quarantine.

持续完整的发情鉴定及记录（第 1、第 2 或第 3 次发情）十分重要，尤其是在隔离检疫期间更为重要。



◆ Then it can be estimated, how many gilts are ready for insemination.

之后方可更好的预估可以进行配种的后备母猪数量。

◆ The gilts should be introduced to the current mating group of old sows.

将后备母猪转入当前的配种群组。

◆ The current sow group should be filled up with gilts There must always be enough sows available for insemination.

充实配种群组 配种母猪群组中母猪数量必须充足。

◆ Gilts are grouped for introduction into the current sow group for mating on the weaning day.

断奶当天，后备母猪要和经产母猪一起转入计划配种群组。

4.3 Planning the introduction of gilts 后备母猪入群规划

◆ Replacement rate of sows on a farm should be between 35 – 50% per year



后备母猪年更新率应为 35 - 50%。

◆ Stable farms 35%

经营状况稳定的猪场，后备母猪年更新率 35%

◆ Breeding farms should have at least 50%

育种场的后备母猪年更新率不低于 50%。

◆ Too low replacement rate – you hold old unproductive sows in the farm.

年更新率过低，则场内存有应淘汰的高胎次或低生产力的母猪。

◆ Too high replacement rate – you might get problems with the health status.

年更新率过高，则可能会出现种群健康问题，风险增加。

◆ The plan for the introduction of the gilts should be done early enough.

后备母猪引入工作必须提前规划。

◆ For example 例如：



Farm with 1000 sows – working in a 1-week-rhythm with 50% replacement rate means 500 gilts per year – round about 10 gilt-litters per week!

Farrowing rate of the gilt– 90% -> 11 inseminations of gilts per week.

存栏 1000 头母猪，按周批算，50% 的更新率意味着每年需要 500 头后备母猪，大约每周需要 10 头后备母猪分娩！

如果母猪分娩率 90%，则每周需要配种 11 头母猪。

When the farrowing rate is lower you need more gilts!

分娩率越低，需要补充的后备母猪就越多！

5 Insemination 配种

The insemination success is influenced by a lot of different factors inside a farm:



配种工作是否卓有成效受场内许多不同因素的影响：

◆ Health status (PRRS, Leptospirosis, ...)

猪只健康状况（蓝耳病、钩端螺旋体病）

◆ Feeding

饲喂营养

◆ Housing */ climate

猪舍设置 / 舍内气候环境

*Fertility also depends to a large extent on the lighting regime. The use of instance light bands showed an increase of 0.55 in the number of piglets born alive per sow and year.

繁殖力在很大程度上受光照制度的影响。比如，适宜的光照能让每头母猪年产活仔数增加 0.55 头。



Figure 5: Example of a functioning light programme in mating house (Source: GFC; 2018)

图 5: 有效光照示例（来源：德国农场咨询有限责任公司 2018）

You need: 1 fluorescent lamp for 2 – 3 pens, 58 Watt; 1,5 m above the sow's eyes, ca. 300 Lux

需要采取措施：每 2-3 个栏位安装一个 58 瓦荧光灯；设置在母猪眼睛上方 1.5 米处，约 300Lux。



The skills and technical professionalism of the workers are the key factors for the success of insemination

配种是否卓有成效的关键因素是操作人员的技术水平。

5.1 Optimal timing for insemination 最佳配种时间

◆ 2 times a day heat control with an active boar – write down the result in a heat calendar.

每天两次用公猪试情，并将结果录入发情日历。

◆ Ovulation: 30 to 36 h after toleration of the boar – start of the last third of the heat.

排卵：开始静立（接受爬跨）后 30 - 36 小时，即发情后三分之一时段开始时。

◆ Difference in heat duration depends on the start of the heat: early, normal, late (24 up to 72 h).

发情持续时间的长短取决于开始发情的时间：早、正常、晚（24 -72 小时）。



◆ Short time period for fertilisation ability of sperms (max. 24 h) and ovum (ca. 4 h) in the genital tract.

精子和卵子在生殖道中保持授精能力的持续时间较短，精子最长 24 小时，卵子约 4 小时。

◆ Optimal: 16 to 24 h before and up to 4 h after ovulation.

最佳配种时间：排卵前 16-24 小时至排卵后 4 小时。

◆ Inside a farm we are not able to detect the exact time of ovulation, so we work with double inseminations.

因猪场无法精确地检测排卵时间，因而通常配种两次。

◆ The ovulation is mostly after 75 % of the heat period, or on average 42 h after the start of the heat. But there are differences between gilts and sows, i.e. gilts have a shorter heat period. Differences of heat duration can also be found between farms.

排卵大多数发生在发情期间的后四分之一时段，或平均在发情 42 小时前后。但是和经产母猪相比，后备母猪的发情持续时间较短。不同养殖场的母猪发情持续时间也不同。

◆ A.I. after the ovulation reduces the success to achieve early gestation.



在排卵后进行人工授精会降低受胎成功率，导致母猪不能尽快妊娠。

◆ Early gestation is also influenced by breed, parity and nutritional status.

除此之外，品种、胎次以及饲喂营养效果也会影响母猪是否能够尽快妊娠。

5.2 Insemination Monitoring 配种监测

◆ For a good insemination monitoring of the chosen date of insemination an analysis of farrowing rate, number of born piglets, live-born piglets, dead piglets etc. should be carried out and the results should be compared for different dates of insemination.

想要获得良好的配种监测效果，一定要分析各个配种环节的关键数据，如分娩率、出生仔猪数、活仔数、死胎数等。还要在不同的配种批次之间横向比较这些数据结果。

◆ The observations have to be written down very carefully.

同时，各项监测结果必须认真记录。



◆ The insemination monitoring should be done for gilts and sows. It is more than only fertility monitoring.

对后备和经产母猪都要进行配种监测，并有效利用这些监测结果和数据，以便优化生产。

◆ The heat detection is noted two times a day beginning with day 3 after weaning.

从断奶后第 3 天开始，每天进行两次发情鉴定，识别发情并予以记录。

◆ Write down the date and time of first, second and third A.I.

记录下第一次、第二次及第三次配种的日期和时间。

☑ Add after 21 or 28 days the results of an ultrasound pregnancy test.

记录下配种后 21 或 28 天后的妊检结果。

◆ Add the results of farrowing (yes / no – why not; total born piglets, live-born piglets, dead piglets).

记录下分娩结果（分娩 / 没有分娩（原因）、出生仔猪数、活产仔猪数、死胎数）。



Piglet index 仔猪指数：

It is a quick and easy tool to control your reproduction success by multiplying the farrowing rate and live-born piglets. Changes in both traits can be seen very easily.

仔猪指数是一种有效和易于掌握的母猪繁殖性能的测量方法，通过分娩率和活产仔数计算而来，这两个参数的变化易于辨识。

For example 例如：

$$\blacklozenge 84,0 \times 11,7 = 983 \text{ live-born piglets} / 100 \text{ inseminated sows}$$

84.0 (分娩率) \times 11.7 (活产仔数) = 983 活仔数 / 100 头配种母猪

$$\blacklozenge 86,0 \times 12,0 = 1032 \text{ live-born piglets} / 100 \text{ inseminated sows}$$

86.0 (分娩率) \times 12.0 (活产仔数) = 1032 活仔数 / 100 头配种母猪

→ + 49 live-born piglets with the same work!

→ 在完成相同的工作的情况下，增加了 49 头活产仔猪！

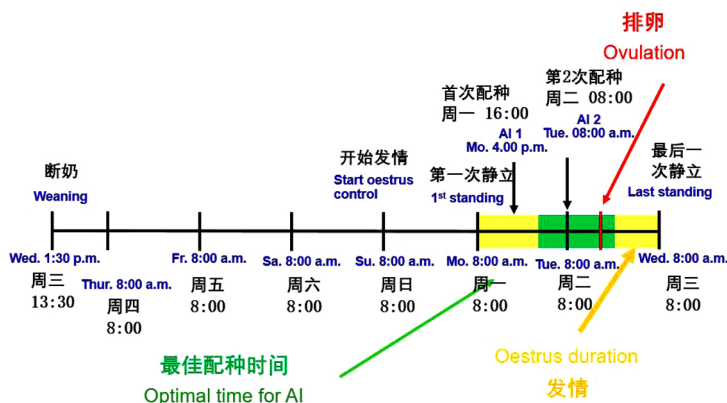


Figure 6: insemination monitoring (Source: GFC; 2018)

图 6: 配种监测 (来源: 德国农场咨询有限责任公司 2018)

With a complete insemination monitoring you are able to find problems in the A.I. management. It is also helpful to work with the piglet index. By this, you are able to improve the performance of the insemination in a stepwise manner.

通过落实完整的配种监测，可以及时发现配种管理中存在的问题并予以解决。仔猪指数是很有帮助的测量方法。如能贯彻落实这些措施，将逐步获得更多的配种成果。



5.3 Artificial Insemination - step by step 人工授精操作步骤

◆ Before inseminating the sows, clean your hands thoroughly, put on new gloves and use a paper towel to clean the vulva.

在给母猪配种之前，请彻底清洁双手，带上新手套并用纸巾清洁外阴。

◆ Lubricate the tip of the catheter using any non-spermicidal lubricant or a few drops of extended semen. Avoid getting lubricant in the opening of the catheter.

使用不杀精的润滑剂或几滴精液给输精管端口润滑，但要避免润滑剂渗进端口。

◆ Gently guide the catheter, with the tip pointed up to avoid getting in contact with the bladder of the sow, through the vagina to the cervix.

轻慢斜上插入输精管，避免输精管接触膀胱，通过阴道抵至子宫颈。

◆ Clean your hands and use new materials for each sow

清洁双手，每头母猪都要使用新的耗材，耗材不能重复使用



Figure 7: Putting the catheter into the sow's vulva

图 7：将输精管插入母猪外阴

◆ A foam-tipped catheter is inserted up against the cervix:

将输精管（带泡沫端头）插入子宫颈；



Figure 8: Pushing the catheter up to the cervix (Source: GFC; 2018)

图 8：将输精管斜上推至子宫颈（来源：德国农场咨询有限责任公司 2018）

◆ Gently invert the bottle of diluted semen two or three times to mix the semen.

轻轻地将装盛已稀释精液的精液袋倒置，并摇晃 2 到 3 次来混合精液。

◆ Attach the bottle to the end of the catheter and discharge the semen slowly.

将精液袋与输精管末端连接，使精液缓慢流出。

◆ A gentle squeeze to start the process may be needed, but after that the semen should be allowed to be taken up by the sow (uterine contractions).



可能需要起先轻轻的挤压精液袋，但之后要让精液自行流出（通过子宫收缩）。

◆ This process takes at least 3 minutes.

这个输精过程需要至少 3 分钟。

◆ Gilts often take longer for insemination than breeding sows.

后备母猪（即头胎母猪）需要的输精时间比经产母猪长。

◆ Depositing the semen too rapidly will cause a backflow of semen out of the vulva.

流速太快会导致精液倒流出阴户

→ In natural service, the boar spends 5 to 10 minutes at each breeding.

→ 本交时，公猪每次输精需要 5 到 10 分钟

◆ A small amount of semen backflow is expected. If a big amount of backflow occurs, stop the insemination.

会有少量精液倒流，如果发生大量倒流，则要停止输精

◆ If semen flow stops



如果精液停止流动

◆ turn or move the catheter back and forward a bit to reinitiate semen flow.

稍微向前或向后移动或转动输精管，让精液重新开始流动

◆ cut a small hole in the semen bottle if flow has stopped because of a vacuum inside the bottle.

由于精液袋内的真空现象导致流动停止，则可以在袋上扎出一个小孔



Figure 9: Usage of boar imitating materials (Source: www.landwirt.com, 2019)

图 9：使用模仿公猪爬跨的工具（来源：www.landwirt.com 2019）



◆ If there is a great deal of resistance to the flow of semen, reposition the catheter because the tip may be lodged against a cervical fold.

如果精液流动遇有阻力，需挪移输精管，因其端口可能已紧贴子宫颈褶皱

◆ Semen transport and fertilization can be inefficient when females are frightened or disturbed. Females should always be handled calmly and gently. The breeder is trying to mimic the boar, and the breeder who takes the extra time and effort to imitate this well will have more success with A.I.

当母猪受到惊吓或侵扰时，精液的输送和受精效果会受到影响，因而配种时对待母猪应始终采取平静和温和的方式。为了达到更好的配种效果，配种员应花额外的时间和精力尝试模仿公猪。

◆ A boar should always be present in front of the sows.

配种时应确保公猪始终出现在母猪面前

◆ Apply back-pressure to the sow in the presence of the boar and massage the female's flank during insemination to increase the number or intensity of uterine contractions that transport semen into the uterus.



对母猪压背，并在输精过程中按摩母猪侧腹，以增加子宫收缩的次数和强度。

◆ If a sow refuses the boar, simply remove it for at least an hour and then try again.

如果母猪表现出对公猪的拒绝，则需要将公猪转离至少一小时，之后再次尝试。

◆ Sows have to initiate uterine contractions for sperm transport with the standing reflex.

母猪必须通过静立反射让子宫收缩，以便完成精液输送。



Figure 10: Boar on the boar boulevard for stimulation of the sows
(Source: GFC; 2018)

图 10：在公猪通道对母猪诱情的公猪

◆ When all of the semen has been “sucked” into the uterus, remove the catheter by rotating it clockwise while gently pulling.

所有精液被子宫“吸入”后，顺时针旋转输精管并轻慢拉出。

◆ A new catheter should be used for each insemination to avoid transmission of disease or infection from one sow to another.

每次输精均需使用新的输精管，以防母猪之间传染疫病。

◆ Keep the newly inseminated sows in quiet surroundings for 20



to 30 minutes.

确保已受精配种的母猪在安静的环境中待驻 20 到 30 分钟。

→ Stress could disrupt semen transport and fertilization.

→ 精神压力会破坏精液的输送，影响受胎率。

◆ Write down the date and time of A.I. into the insemination monitoring list!!!

在配种监测清单中明确记录配种的日期和时间!!!

6 After A.I. until farrowing 配种后至分娩管理

◆ The sows should stay in the same housing until the first ultrasonic test.

直至第一次孕检时母猪饲养在配种舍。

◆ To minimize stress in a critical time → Implantation of the egg



cell into the uterus.

为的是在此关键时期减少应激→受精卵在子宫着床。

◆ Even little stress can lead to coming back into heat

即使很小的应激都可能会导致返情。

◆ Gilts should be separated from old sows.

在待产舍中后备母猪要和经产母猪分开饲养。

Tests during gestation 妊娠期检查

◆ Control for signs of heat after 21 and 42 days (with an adult boar).

21 天和 42 天后用公猪进行返情检查。

◆ With good management you can find sows, which return to heat until the 21st day of pregnancy. 90% of all sows back in heat in the respective group must be found by day 21.

如果管理落实到位，各群组中分娩后 21 天返情的母猪 90% 均可被找出。



◆ Pregnancy test (Ultrasonic test) after 28 days. Sows without a clear result should be tested one week later again.

配种后 28 天进行孕检（B 超）。可疑母猪一周之后再次进行孕检。

◆ Documentation!!!

一定要做好记录 !!!

◆ Only clearly pregnant sows are moved to group pens after the 4th week of gestation. Questionable sows remain in individual pens and are tested again with an ultrasound device after another week.

明显并确定怀孕的母猪转入怀孕 4 周后的群养待产舍。可疑母猪保留在独立栏位中隔一周进行第二次孕检。

◆ Non pregnant sows have to be removed immediately from their group. Based on the date of the next likely date of farrowing, the sow will be transferred to the corresponding week group.

非怀孕母猪必须立即转出。根据下一个预产期，将母猪转移到相应的群组中。

◆ In the group pens, too, attention is paid to those sows which could return to heat, on a daily basis. Sow groups which are pregnant



for 42 days are intensively observed on day 40, 41, 42 and 43 post A.I twice a day for possible signs of heat.

同样，在待产舍的群养栏中也必须每天关注是否出现返情母猪。对配种后 42 天的母猪要额外关注是否有发情迹象，对此要在第 40、41、42 和 43 天每天观察两次。

Anyone in the pen, regardless of their function, must immediately note and mark any sow, which returns to heat and immediately notify the responsible person.

无论职责和职位，圈舍中的所有工作人员，一旦发现返情母猪都必须立即予以记录，并标记母猪，同时通知相关负责人处理。

◆ After 4 weeks (28 days) the sows can be moved to the waiting pen in group housing. The sows remain in their groups until about 3 to 4 days before farrowing.

怀孕 4 周（28 天）后，可以将母猪转入待产舍群养（期间不转群），直到预产期前 3-4 天。



The following measures must always be carried out consistently:

必须始终贯彻执行以下措施：

◆ The date of insemination is recorded on the sow card.

配种日期要登记在母猪信息卡上。

◆ The date for the control for signs of heat at 21 days and 42 days is calculated at the time of insemination and also recorded on the sow card.

在配种日计算并记录配种后 21 天和 42 天时要进行的返情检查日期，并登记在母猪信息卡上，以便届时按时落实。

◆ The farrowing date is calculated and noted on the sow card.

计算预产期并登记到母猪信息卡上。

◆ The sows are always together on the farm per insemination week, because this enables effective control.

每个配种周，母猪均集中统一处理，管理操控会更有效。

◆ Even after insemination, as long as the sows are standing in individual pig pens, the control for signs of heat is carried out twice a day, always at fixed times (30 min. after feeding) with a boar. One boar



is required for 150 sows.

即使在配种后，只要母猪在独立栏位中，就要在固定的时间（饲喂后 30 分钟）用公猪进行返情检查，每天两次。每头公猪负责 150 头母猪查情。



全国畜牧总站 中国饲料工业协会