# Reproductive Managements of Duroc, Landrace and Yorkshire Pig

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# OUTLINE

Introduction
Selection of breeding stock
Gilt, boar/AI management
Mating management
Pregnancy, farrowing, lactation and weaning to estrus interval management

# Introduction

No. of swine farmers：9,965

Boar: 26,710 heads

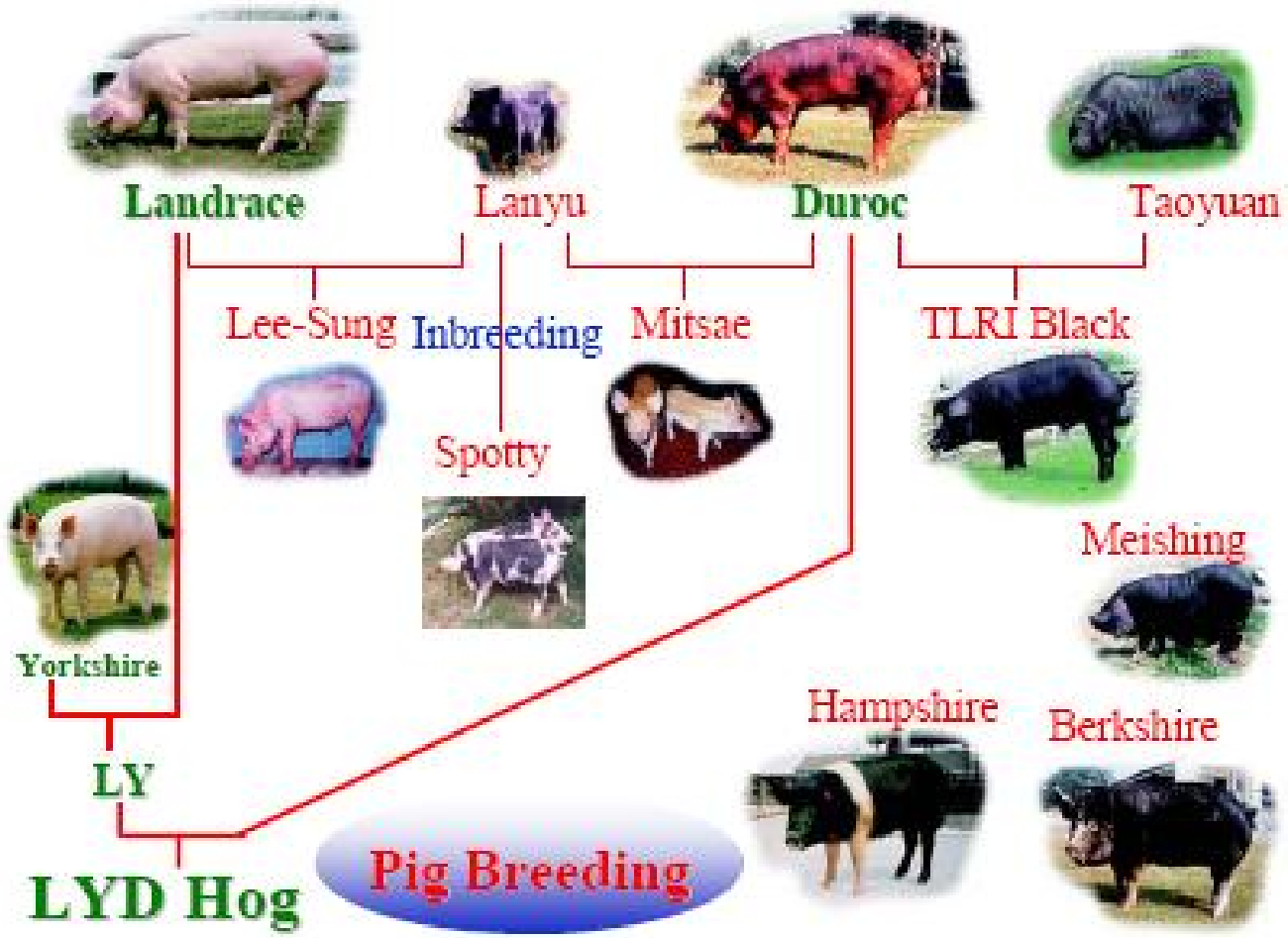
Gilt and sow: 692,716 heads

Hog (<30kg): 1,576,580 heads

Hog (30-60kg): 1,522,158 heads

Hog (>60kg): 1,473,740 heads

Agricultural Statistics Annual Report, 2010




Exotic breeds（Landrace, Yorkshire, Duroc, Hampshire, Berkshire, Meishing）、native breeds（Lanyu, Taoyuan）and new breeds（Lee-Sung, Spotty, Mitsae, TLRI Black, *Kao-Shi Balck*）

# selection of breeding stock

Major breeds in Taiwan
Growth performance
Selecting considerations

# Major breeds Boar


Taiwan Duroc ♂


Taiwan Landrace ♂


Taiwan Yorkshire ♂

# Major breeds Gilt


Taiwan Duroc ♀


Taiwan Landrace ♀


Taiwan Yorkshire ♀

# Growth Performance Test of Boars in Taiwan (from 40 to 110 kg of body weight)

**Selection Index for L and Y =**
**100 + 140 (ADG-MADG) - 60(FE-MFE) - 30(BF-MBF)**

**Selection Index for D =**
**100 + 120 (ADG-MADG) - 55(FE-MFE) - 50(BF-MBF)**

## Halothane Test and DNA Typing of PSE in 1988

| | L | Y | D |
|---|---|---|---|
| ADG (Average daily gain), kg | 1.114 | 1.145 | 1.100 |
| FE (Feed efficiency, Feed/Gain) | 2.082 | 2.083 | 2.070 |
| BF (Backfat thickness), cm | 1.309 | 1.325 | 1.293 |

# Growth Performance Test of Gilts in Taiwan (from 30 to 100 kg of body weight)

| | L | Y | D |
|---|---|---|---|
| ADG (Average daily gain), kg | 1.004 | 0.963 | 0.925 |
| FE (Feed efficiency, Feed/Gain) | 2.166 | 2.196 | 2.201 |
| BF (Backfat thickness), cm | 1.403 | 1.465 | 1.451 |

Halothane gene free in L and Y gilts of nucleus herds on 2000!

# Selecting considerations

1. Healthy and without any genetic defects
2. Twelve or more functional teats
3. Comes from the litter which litter size is more than 6 piglets
4. Buy from reliable breedstock producers, pig performance testing station and on-farm testing swine stock farmer

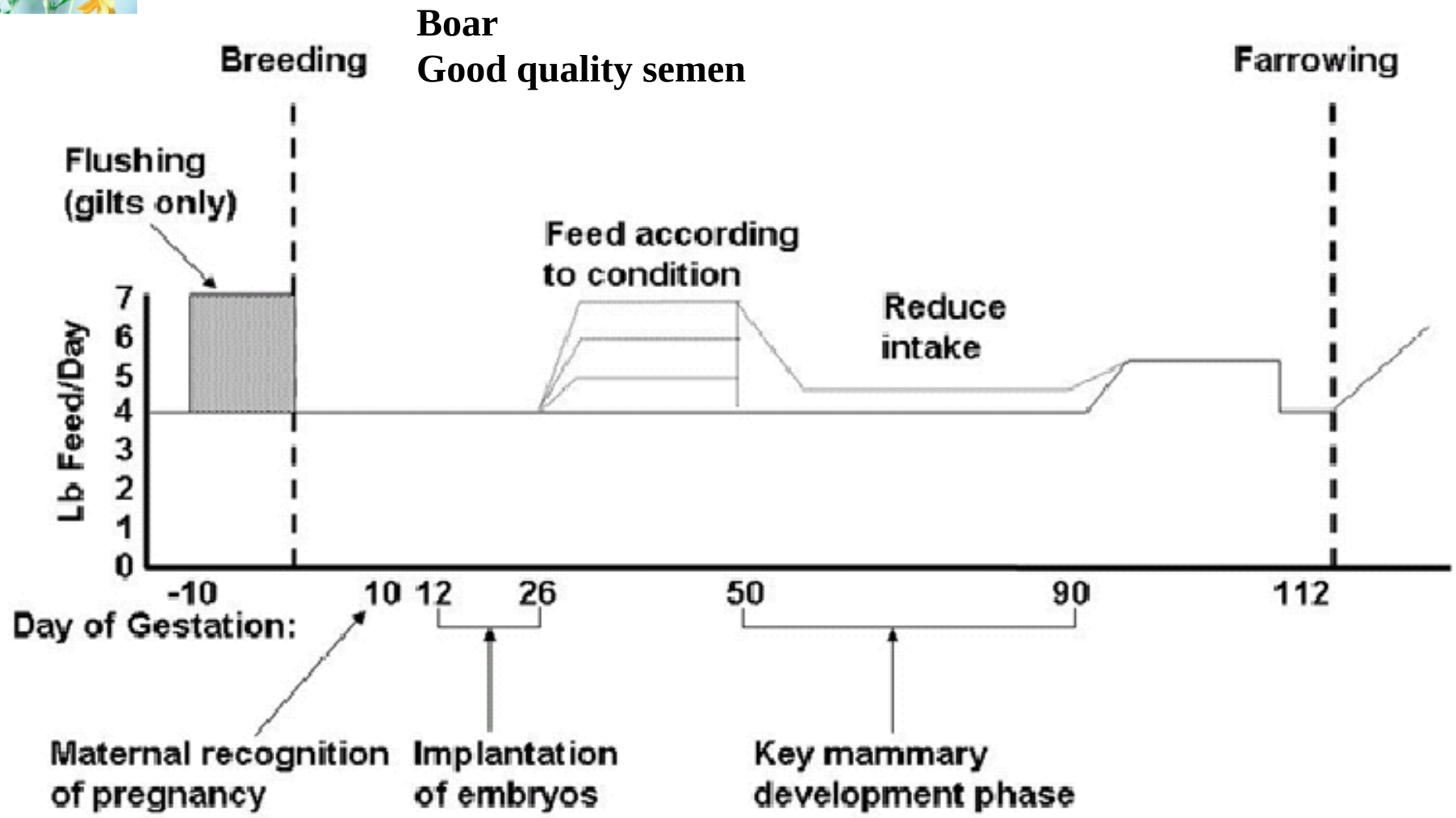
# Selecting considerations

5. Select from the top 50% based on the performance records
6. Select boars and gilts with sound feet and legs
7. Purchase boars and gilts (5.5 to 6 months old) at least 60 days before being used

# Gilt and Boar/AI Management

- Gilt management
- Boar housing
- Semen collection, semen evaluation
- Artificial insemination

# Sow Reproductive Time Line and Recommended Gestation Feeding Program

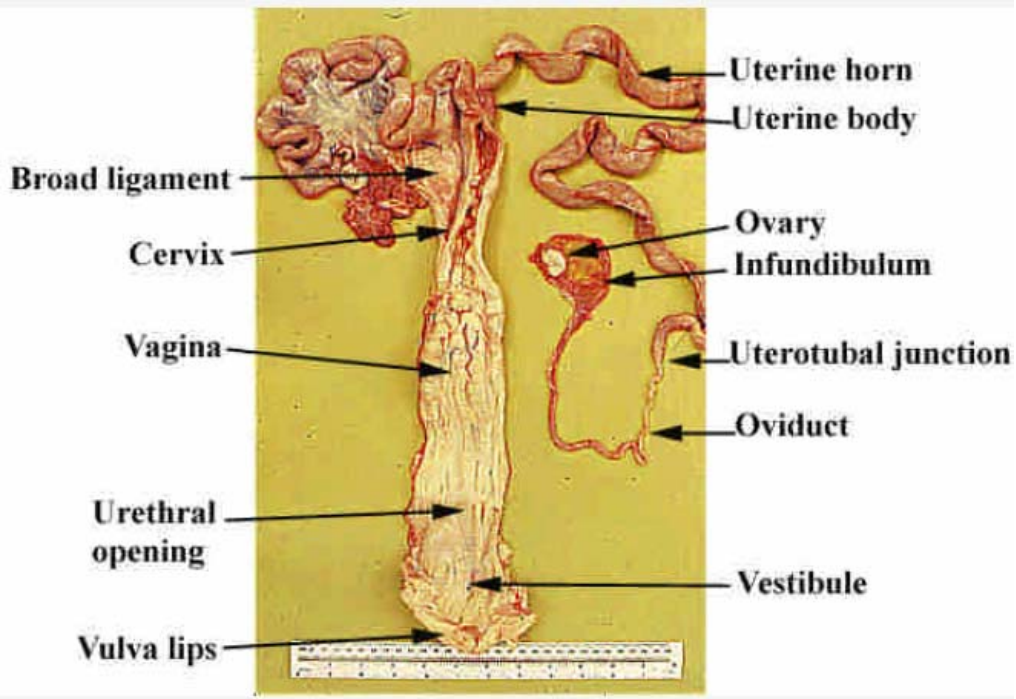


# Gilt Management

1. Exposed to an aggressive boar
2. Moving and mixing
3. Not be fat or slim

Pin-bones, vertebrae and edge of transverse spinal processes only felt with firm pressure. No cavity around tail. Very difficult to feel any ribs.

4.Reduce heat stress

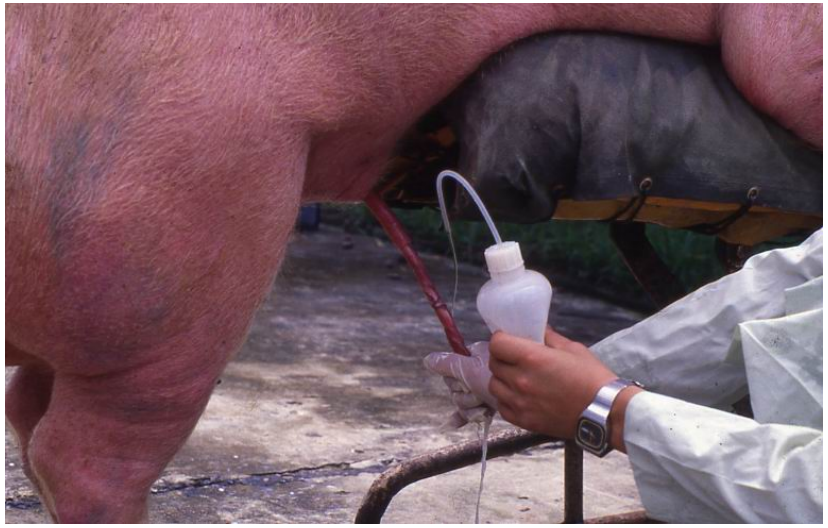




Reproductive tract (non-pregnant)

# Boar housing

- § Housing boars individually eliminates fighting, riding and competition for feed
- § Keep boars comfortable during warm months (>85 ℉). Provide sprinklers, shade or AC during the hot hours of the day
- § Keep boars not too fat or slim
- § Avoid slippery floor of mating room

# semen collection



# Semen evaluation

Binocular microscope

Phase contrast microscope

Micro-cuvettes

# Semen evaluation


Plasma membrane integrity

Plasma membrane permeability and stability

Acrosome integrity

Mitochrondrial status

Chromatin intactness

Apoptotic-like changes

Oxidative sress

Unmature sperm

# Artificial insemination

***Advantages:***

- **Allows for widespread use of superior boar**
- **more uniform pig crops**
- **Decreased problems**

**-- Less risk of injury to boar, sows and stockman**

**-- Isolation and testing of newly introduced boars**

**-- Decreased housing and feed cost**

- **Reduced risk of disease transmission**

***Disadvantages:***

v **High level of management required**

v **Adequate facilities**

# Swine Liquid Semen Extender

**Super Up Ⅱ**

**BTS (Beltsville Thaw Solution)**

**Minitub Merk Ⅲ**

**Kiev**

- extended typically to create 50 mL aliquots containing 5.0 million cells
- Storied at 15-18℃, 3-5 days

# Mating Management

- Individual-mating system
- Estrus detection
- Timing and frequency of mating/insemination
- ***Determine boar power requirements***

# Mating management

- **individual-mating system**
- Breeding dates for each female are known
- Boars can be penned and managed individually
- Selective matings are possible
- Mating frequency of boars can be controlled
- Females can be double-mated
- allow reproductive success or failure to be detected at an earlier date
- Requires dependable, well-trained, and motivated labor

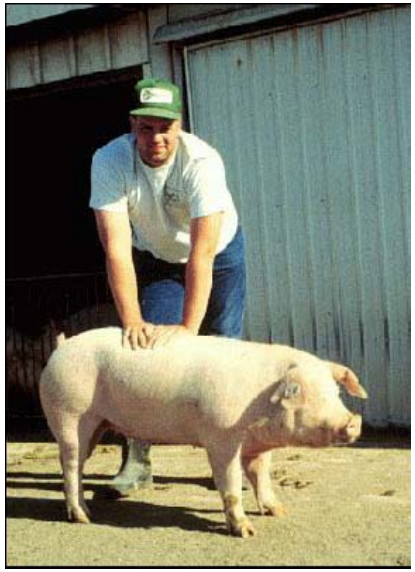
# Estrus detection

- Estrus defined as the period of sexual receptivity to the boar. Also known as “heat”
- Average duration of estrus is 40-60 hours
- Ovulation occurs 36-48 hours after the onset of estrus
- The pig is polyestrous throughout the year
- Average estrous cycle length: 21days

# Estrus detection

1. The vulvar lips are swollen and red with a thin, mucous discharge
2. Other signs of estrus include: depressed appetite, restlessness, alertness, pacing, grunting, and chomping of the jaws

# Estrus detection



**“standing heat”**

Sow or gilt will stand solidly when pressure is applied to her back

# Timing of Mating

**--Maximum ovulation (after the onset of standing heat)**

**Gilt: 24-36 hours; Sow: 36-48 hours**

**-- Life span of the egg: 8-10 hours**

**-- Sperm arrive at the site of fertilization: 1 hour**

**-- Life span of the sperm: 24-50 hours**

**-- Sperm capacitation: 6 hours**

# timing and frequency of mating/insemination

| Suggested timing of mating when employing AI | | |
|---|---|---|
| Frequency of estrus detection | Best time to inseminate relative to the first detection of standing heat | |
| | Gilts | Sows |
| Once daily | 0 and 24 hours | 0 and 24 hours |
| Twice daily (12 hours apart) | 12 and 24 hours | 24 and 36 hours |

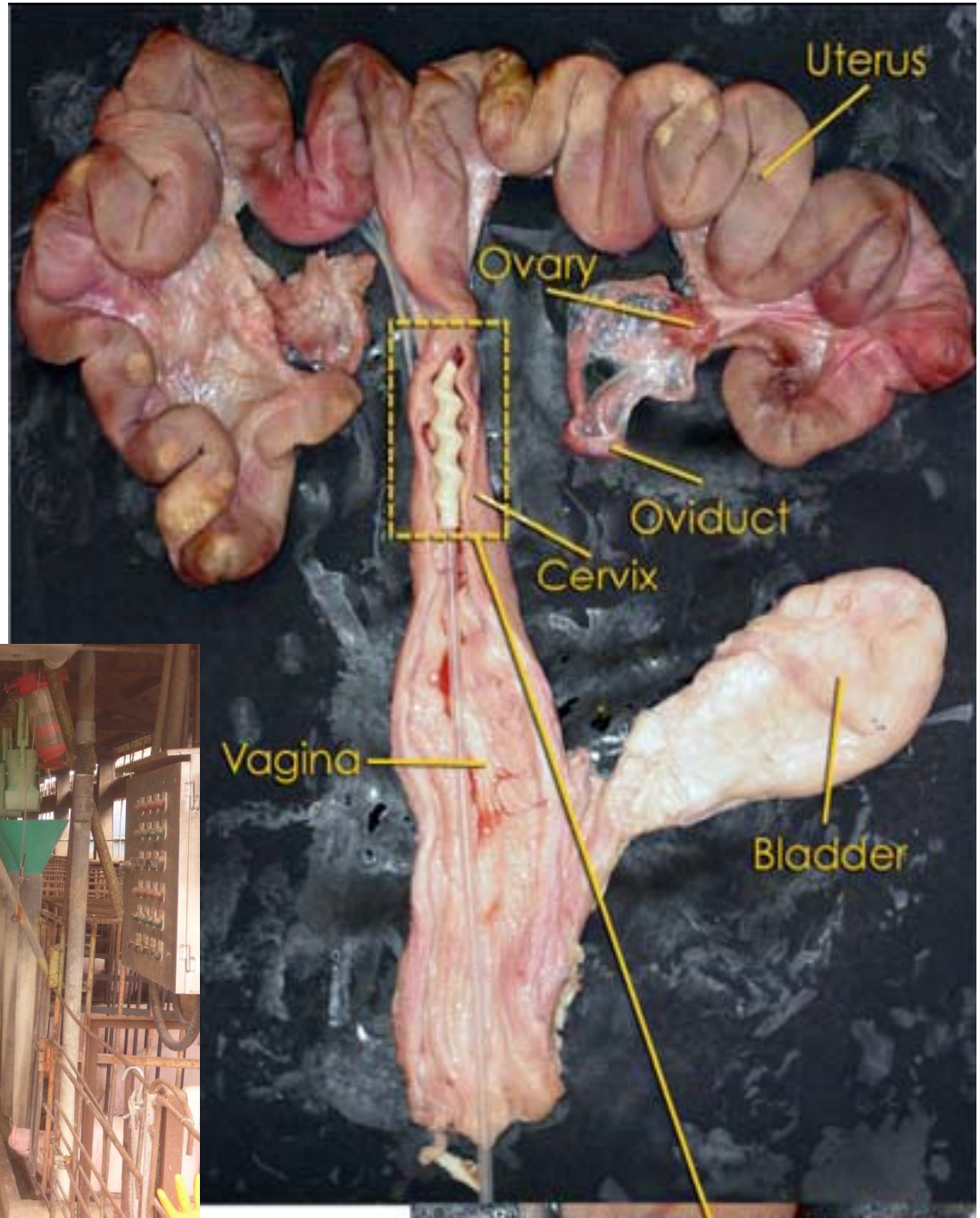
## *Determine boar power requirements*

| *Boar* | *Individual mating system* | |
|---|---|---|
| | *Maximum mating* | |
| | *Daily* | *Weekly* |
| **Young (8 –12 Mos)** | **1** | **5** |
| **Mature (> 12 Mos)** | **2** | **7** |

Before inseminating the female, use a paper towel to clean the vulva.

A tube of semen is attached to the open end and allowed to drain into the cervix

Backflow Stop type
Spiral type


Uterus
Ovary
Oviduct
Cervix
Vagina
Bladder

# Pregnancy, farrowing, lactation and weaning to estrus interval management

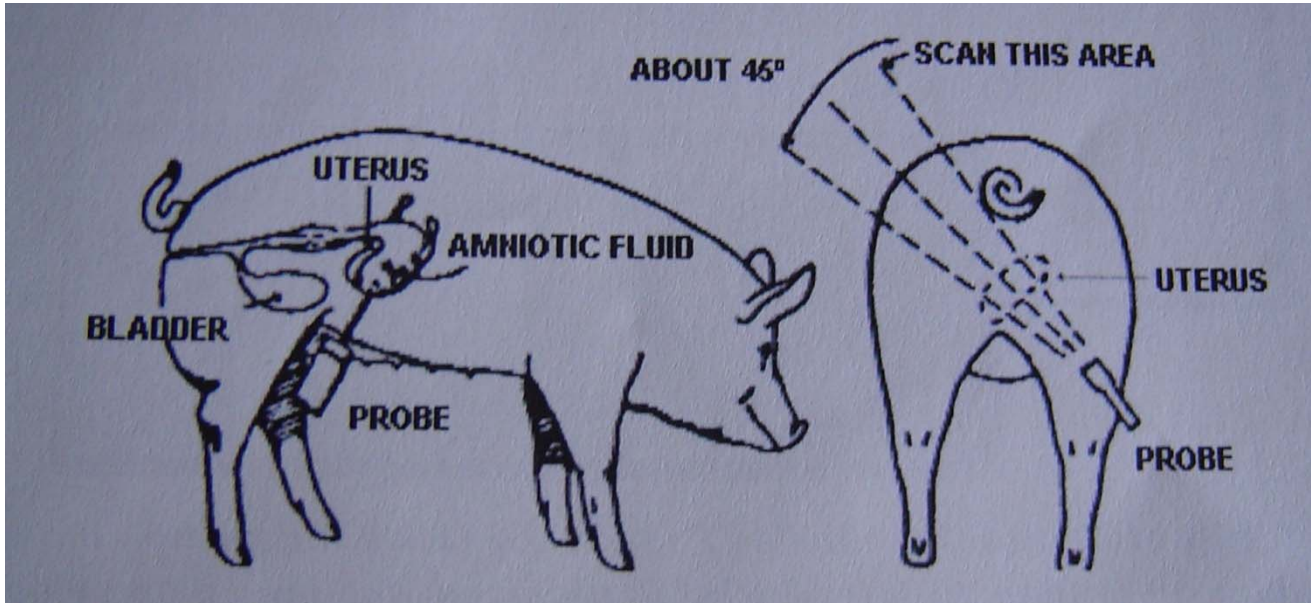
- pregnancy diagnosis and management
- *Care of the sow during farrowing and lactation*
- Weaning to estrus interval

# Pregnancy diagnosis

1. **If breeding data are known, one can check for the animal to *return to estrus*. If she does not return to estrus by her designated date, she is likely pregnant**
2. **If breeding dates are known, estrus detection can be backed up with *progesterone* data**
3. ***Ultrasonic* diagnosis**

# Ultrasonic Diagnosis

1. Ultrasonic detection is typically done at 30-45 days of gestation with 90-95% detection accuracy
2. The sow or gilt is checked in a standing position with the probe placed near the 2nd teat from the rear and pointed toward the middle of the back



# Ultrasonic Diagnosis



# Pregnancy management

- Average duration of gestation is 114 days (111-117 days)
- Two-thirds of growth of fetus is made the last month of the gestation period
- Mature sows: 35-40 kg body weight gain: gilts ：45-55 kg body weight gain
- Avoid heat stress

# *Care of the sow during farrowing and lactation*

## *A. Prefarrowing*

1. **Treat sows once (3 wk before farrowing) for internal and external parasites before moving to the farrowing facility**
2. **Record breeding dates, calculate farrowing dates, and observe sows closely during late gestation to assure that sows are moved to the farrowing unit by 107th day of gestation**
3. **Feed a ration with laxative effect (high fiber) from day 107 to prevent constipation**
4. **Remove bulky ingredients from the ration soon after farrowing**
5. **Avoid heat stress**

## *B. Farrowing and Lactation*

### *1. Knowing when a sow will farrow*

**a. Presence of milk usually indicates that farrowing will occur within 24 h**

**b. If milk is present, prepare the sow and move her immediately to the farrowing facility**

## *2. Birth process*

**a. Normal farrowing may be completed in less than one hour, or may exceed five hours. The average interval between birth of piglets is approximately 15 min**

**b. Attending sows at farrowing can prevent death of piglets caused by trauma, biting, suffocation inside membrane, and weakness**

**c. Manual assistance in delivery of pigs should be undertaken only when signs indicate inability of the sow to deliver unassisted**

***d. Clipping the navel cord* leaving about 1 in of the cord (at birth)**


*3. Processing baby pigs*

**a. Weighing body weight at birth**

***b. Clipping needle teeth*** **to prevent piglets from biting each other and the sow's udder (within 24 hour after birth)**

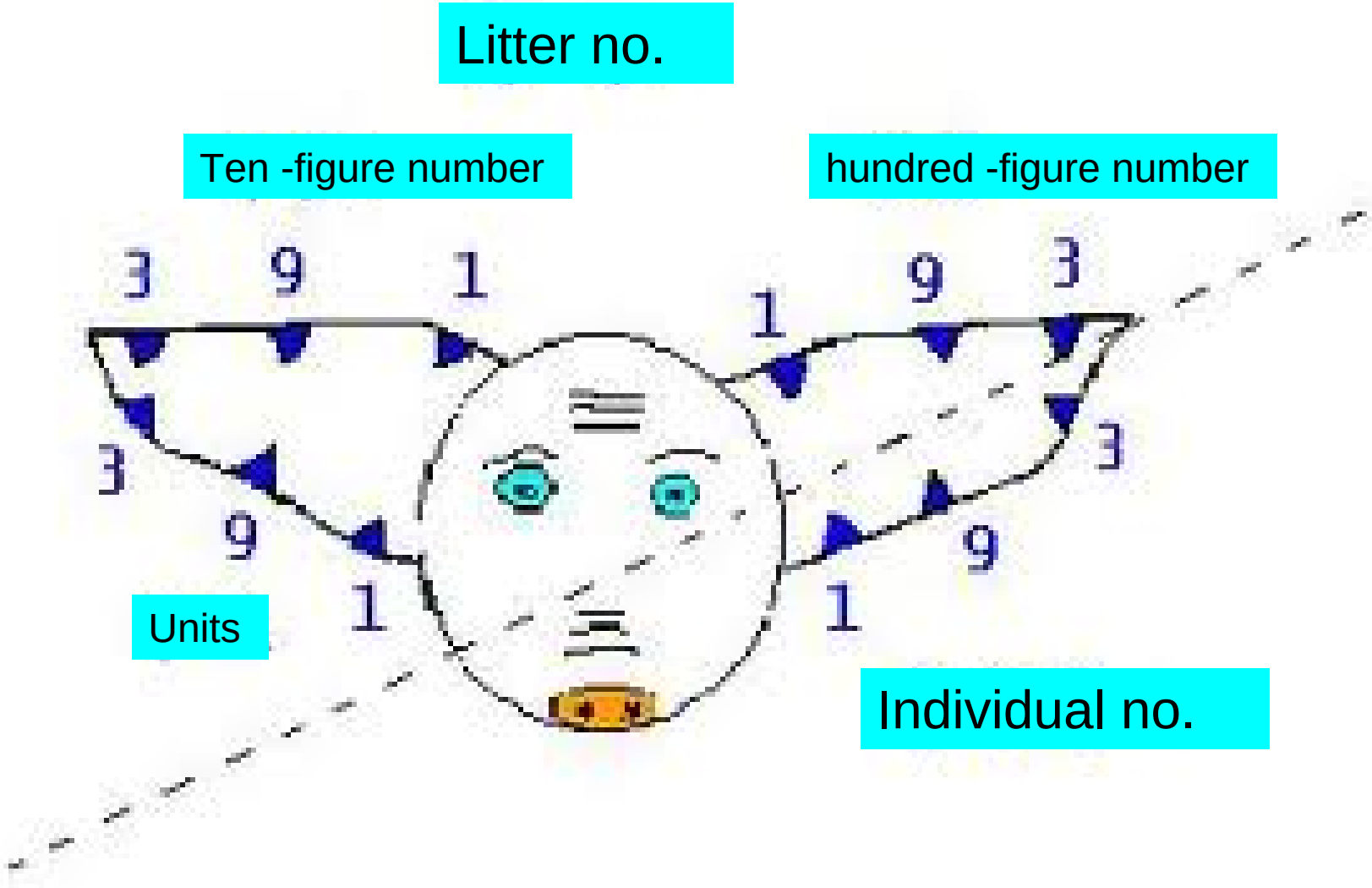
*c. Recording teat number*

*d. Giving iron injection* **to prevent anemia (within 3 to 4 days after birth)**

**e. Warming up piglets by supplement heat lamps**

*f. Ear notching* **for immediate and permanent identification (soon after birth)**

# *Ear notching*



## *4. Nutrition of newborn pigs*

a. Each piglet should receive colostrum to provide immediate and temporary protection against bacterial infections

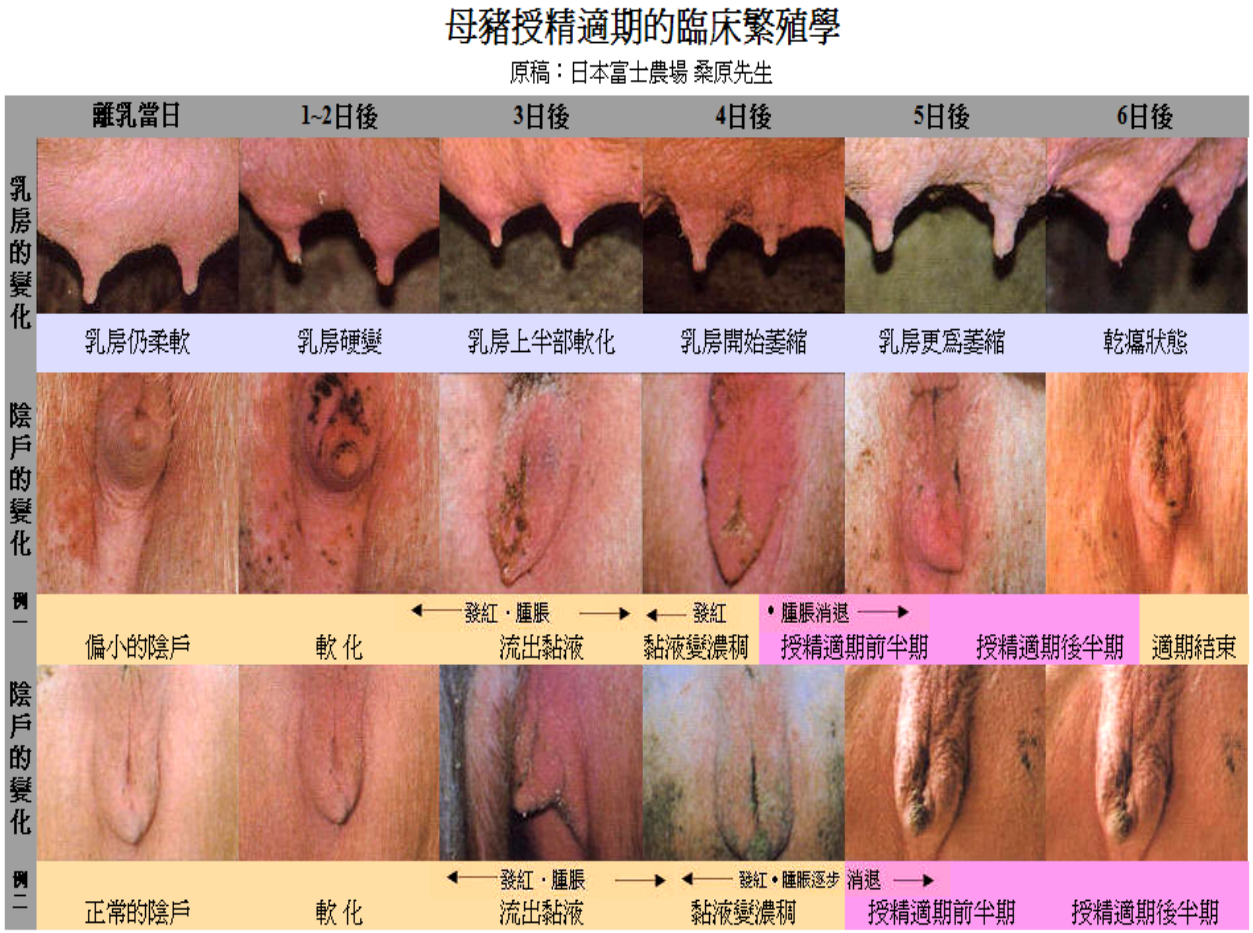
b. The sow's milk does not contain nutrition for baby pigs at 3wks of age, therefore at 1 week of age, start feeding piglets with a prestarter ( 22% protein) in a shallow pan (creep feeding)

c. After pigs start to eat, switch to a starter ( 18% protein) and feed this until pigs' weight reaches 25 to 30 kg

## *C. Feeding the sow during lactation*

1. **Sows nursing large litters need essentially full feeding during lactation (CP 15%, DE 3230 kcal/kg; offer 4.5 kg in summer; offer 5.5 kg in winter)**
2. **For sows that finishing lactation with excessive weight losses or in an energy-depleted condition, estrus will be delayed beyond the usual 3 to 7 days post weaning**
3. **Supplementing the sow's diet with fat during late gestation and lactation may improve the sow and pig performance**
4. **Avoid heat stress**

# Weaning to estrus interval



# Weaning to estrus interval management

- Decreasing  feed offer to sows at 3 or4 days period to weaning day
- Increasing feed offer to sows after weaning day in order to flush estrus
- Most of the sows will begin cycling within four to seven days after weaning and remain in standing estrus for 60 hours

# Thanks for your attention!

- www.angrin.tlri.gov.tw/pig_all.htm