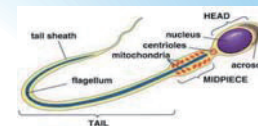


Sperm Maturity of Growth Performance Tested Boars 生長檢定公豬精子成熟度

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* Introduction



- * Mitochondria is a key factor in providing energy for motility and fertilization of sperm.
- * Mitochondria is an energy provider for sperm metabolism.
- * Mitochondrial integrity measurement is an important basis for sperm quality determination.
- * Sperm maturity evaluation of young boars could be done by mitochondrial integrity measurement via sperm flow cytometer.

- * 粒線體是精子泳動的能量工廠，與精子運動及受精能力具有緊密關係
- * 整個精子代謝所需之能量皆由粒線體提供
- * 檢測粒線體完整度是判斷精子品質的重要依據之一
- * 藉由精子體能分析儀檢測種公豬及精子粒線體完整度，評估年青公豬產精成熟度

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* Introduction

- * The semen is collected 20 days (225 days of age) before the auction of the Pig Performance Testing Station of National Animal Industry Foundation, and DNA is frozen in Animal Genetic Resources Information Center.
- * The semen is collected the least 125mL equally and measure the sperm concentration and mitochondrial integrity.
- * Mitochondria is a key factor in providing energy for motility and fertilization of sperm.
- * 財團法人中央畜產會種豬性能檢定站之種公豬225日齡拍賣前20天採精，均有精液樣本送到畜產種原中心作DNA凍存
- * 除要求精液量平均125毫升以上，亦同步進行精液濃度及精子粒線體完整度之檢測

Auction of the Pig Performance Testing Station of National Animal Industry Foundation in 2017

| Class | Date | Class | Date |
|--------|-----------|--------|------------|
| 201607 | 2017/1/25 | 201701 | 2017/7/26 |
| 201609 | 2017/3/22 | 201703 | 2017/9/27 |
| 201610 | 2017/4/26 | 201704 | 2017/10/25 |
| 201611 | 2017/5/24 | 201705 | 2017/11/22 |

* Introduction

- * Agricultural Technology Research Institute had stopped to provide high feed efficiency young boar since 2014.
- * The semen maturity of high feed efficiency boar in the Pig Performance Testing Station of National Animal Industry Foundation have began. These data will help to select high feed efficiency and sperm reproduction of young boar, and to improve the application of high feed efficiency young boar for breeding and hog production in swine industry.
- * 台灣動物科技研究所種豬性能檢定站自2014年起停止供應高飼料效率種公豬
- * 財團法人中央畜產會種豬性能檢定站之高飼料效率種公豬也開始進行精子成熟度檢測，會加倍公豬高飼料效率與產精遺傳同步選拔效率，讓養豬業者提早應用優質的高飼料效率公豬於種豬繁殖及肉豬生產線上，儘速擴散好基因到豬群

*Objective

Early application of the elite young boar breeding stock reproduction and the hog production line

為提早應用優質的高飼料效率公豬於種豬繁殖及肉豬生產線上

Sperm concentration and mitochondrial integrity detection of the Pig Performance Testing Station of National Animal Industry Foundation

檢測檢定站種公豬精液濃度及精子粒線體完整度

Young boar semen productive ability and maturity evaluation

評估年青公豬產精是否成熟

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*Materials&Methods

*Test boars

* A total of 553 finished test boars from 3 breeds (Duroc, Landrace and Yorkshire) in class 201507, 201509, 201510, 201511, 201601, 201603, 201604 and 201605 of the Pig Performance Testing Station of National Animal Industry Foundation were used at this project.

* 試驗豬隻

* 測定之年青種公豬為財團法人中央畜產會種豬性能檢定站201507期、201509期、201510期、201511期、201601期、201603期、201604期及201605期完檢之杜洛克、藍瑞斯及約克夏等3個品種計553頭種公豬。

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*Materials&Methods

| Class | Date | Counts of tested | Counts of finished tested | Counts of collected the semen |
|--------|------------|------------------|---------------------------|-------------------------------|
| 201507 | 2016/1/27 | 125 | 117 | 73 |
| 201509 | 2016/3/23 | 104 | 98 | 63 |
| 201510 | 2016/4/27 | 105 | 88 | 53 |
| 201511 | 2016/5/25 | 118 | 107 | 74 |
| 201601 | 2016/7/27 | 88 | 85 | 69 |
| 201603 | 2016/9/30 | 113 | 103 | 82 |
| 201604 | 2016/10/26 | 94 | 89 | 64 |
| 201605 | 2016/11/23 | 107 | 102 | 73 |
| | total | 854 | 789 | 553 |

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*Materials&Methods

Collected semen notification採精通知

Semen collection(40mL each boar)採精(40mL/頭)

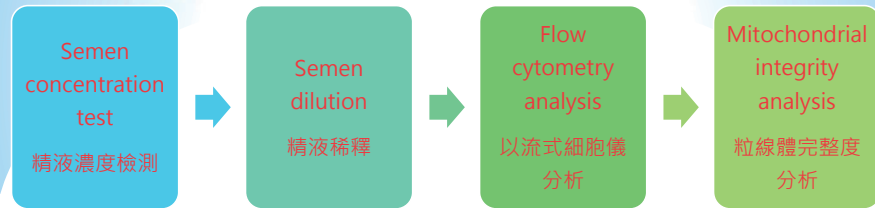
Stored the semen at 17°C將採集精液保存於17°C

Analyzed the sperm concentration and mitochondrial integrity at least 5,000 sperm each semen to assess the semen productive ability
測定精液濃度及同步快速測定每頭公豬精液至少5,000隻精子之粒線體完整度



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* Materials & Methods



* Results

| Test results | Sperm concentration (10 ⁹ /mL) | Mitochondrial integrity (%) | Pass rate of mitochondrial integrity (%) |
|-------------------------|---|-----------------------------|--|
| Duroc (n=350) | | | |
| Mean ± SD | 3.54 ± 1.14 | 65.2 ± 19.5 | 50.6 (177/350) |
| Min | 0.79 | 0.02 | |
| Max | 7.38 | 99.7 | |
| Landrace (n=150) | | | |
| Mean ± SD | 3.8 ± 1.28 | 66.2 ± 21.1 | 54.7 (82/150) |
| Min | 0.65 | 7.6 | |
| Max | 6.95 | 95.4 | |
| Yorkshire (n=53) | | | |
| Mean ± SD | 3.09 ± 1.38 | 60.3 ± 19.1 | 39.6 (21/53) |
| Min | 0.52 | 4 | |
| Max | 6.9 | 91 | |

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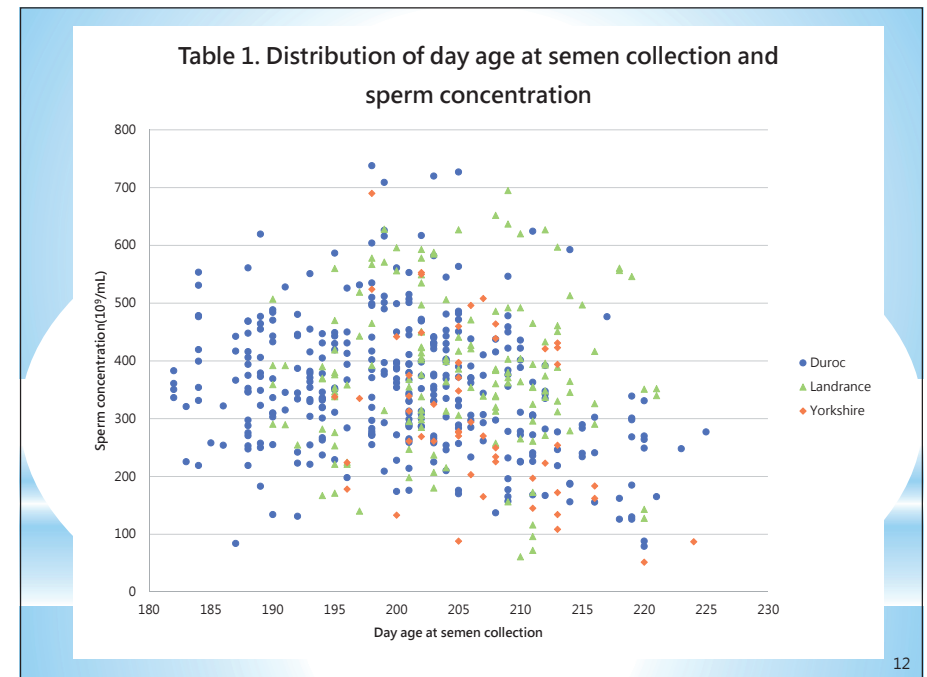
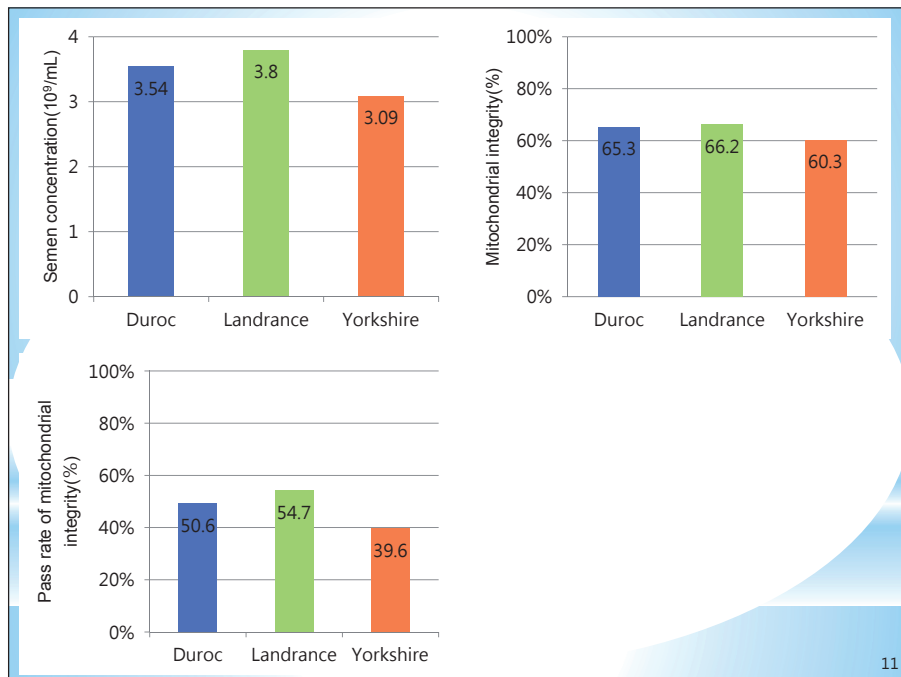
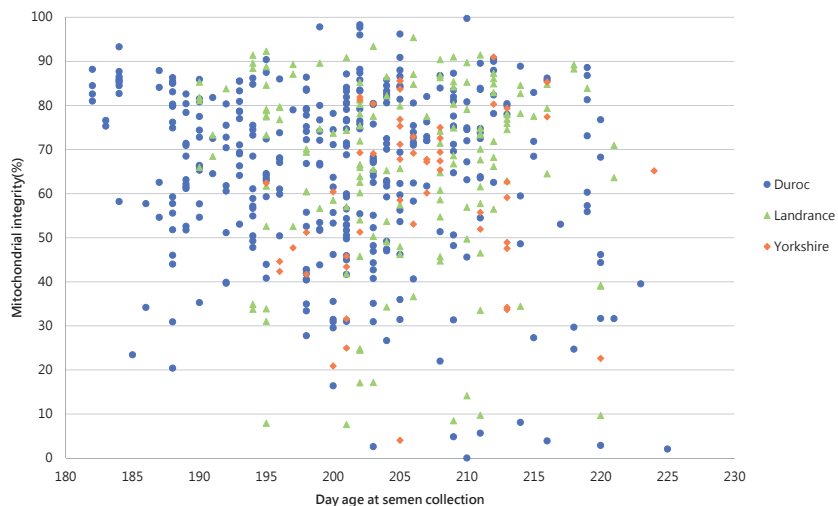


Table 2. Distribution of day age at semen collection and mitochondrial integrity



The best titer of mitochondrial integrity from 3 breeds
 Fig.1 Duroc, 99.7% (No. D1593-02, 仙佳種豬場送檢)。
 Fig.2 Landrace, 95.4% (No. L0117-08, 祝興種豬場送檢)。
 Fig.3 Yorkshire, 91% (No. Y1194-04, 福昌種豬場送檢)。

*Conclusions

*We will imitate to continue the test on the boar sperm for auction in the Pig Performance Testing Station (8 period/year), and progressively utilize other sperm quality analysis projects of the sperm flow cytometer on young boars to build the base value. This could provide a basis for the farm to select breeding boars.

*持續進行種豬性能檢定站每年8期檢定拍賣之公豬精液檢測，逐步將精子體能分析儀其他精液品質分析項目應用在年輕公豬檢測上，並建立其基礎值，以提供送檢場內種豬選育的依據

Thanks for your attention

