

SEASONAL VARIATION ON SEMEN PRODUCTION IN DIFFERENT BOAR BREED IN THAILAND



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Introduction

- A reduction in both volume and TSP during hot season (March-June) in both CONV and EVAP systems
- High temperature and high humidity
 - negative effects on sperm production

Suriyasomboon et al., 2004

Introduction

- The total number of sperm/ejaculate
 - winter (Nov-Feb) > rainy season (Aug-Oct) ($P < 0.05$)
- The concentration
 - early winter (Nov and Dec) < summer and a month in rainy (Jul) ($P < 0.05$)

Tretipskul et al., 2012

Effect of breed; (Total number of sperm production)

- ▶ LY crossbred ($88.2 \pm 27.2 \times 10^9$ sperm/ejaculate)
 - ▶ > Duroc ($60.2 \pm 21.9 \times 10^9$ sperm/ejaculate) ($P = 0.01$)
 - ▶ > Pietrain ($76.5 \pm 21.8 \times 10^9$ sperm/ejaculate) ($P = 0.03$)
- ▶ Seasonal variation effect was most pronounced in Duroc and Pietrain > LY and PD crossbred boars



Tretipskul et al., 2012

Background

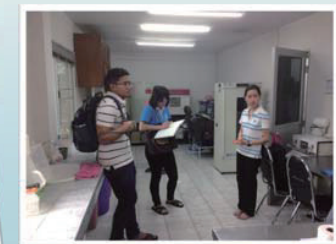
- ▶ Factors effect on semen quality such as
 - ▶ Breed
 - ▶ Age
 - ▶ Season
 - ▶ Temperature
 - ▶ Photoperiod

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Objective

To investigate seasonal influence on semen production in an evaporative cooling system boar stud in Thailand

Materials and methods



Materials and Methods

- Place
 - AI center in the western region of Thailand
 - October 2009 to August 2015
- A total of 1,870
 - 44 boars
- The breed of boars included
 - Duroc (n=11)
 - Large white (n=15)
 - Landrace (n=15)
 - Crossbred boars (Hybrid Pak-Chong5) (n=3)

Materials and Methods

- Gloved-hand method
 - subjective motility
 - semen volume
 - sperm concentration
- The total number of sperm/ejaculate=
 - semen volume x sperm concentration**
- Season
 - Cool** (15th Oct - 14th Feb)
 - Hot** (15th Feb - 14th Jun)
 - Rainy** (15th Jun - 14th Oct)

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Statistical analysis

- General linear mixed model
- SAS version 9.0 (SAS®, NC, USA)
- Models
 - fixed effect
 - breed, year and season of collection
 - random effect
 - Boar ID

Results and discussion

Table 1 Descriptive statistics on the semen production in boars kept in EVAP system housing in Thailand

Variables	Means \pm SD
Semen volume (ml)	264.6 \pm 93.5
Sperm concentration ($\times 10^6$ sperm/ml)	276.2 \pm 122.6
Total sperm/ ejaculate ($\times 10^9$ sperm)	68.1 \pm 28.4
No. of extended semen dose/ ejaculate	15.9 \pm 6.0

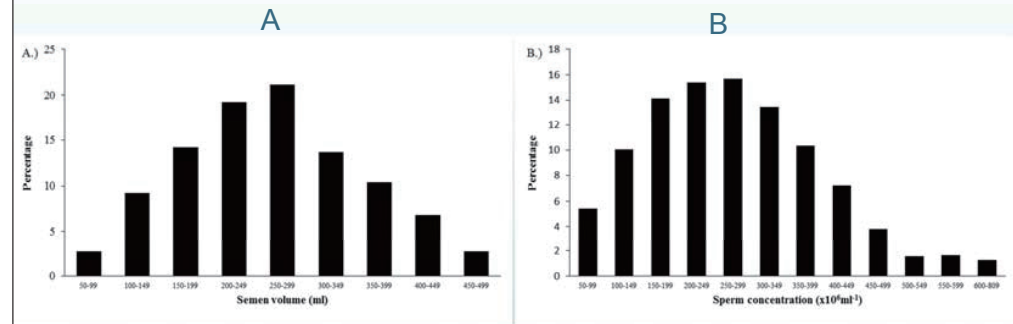


Figure 1 Frequency distribution of the semen production of boars kept in EVAP house in Thailand (A.) Semen volume (B.) Sperm concentration

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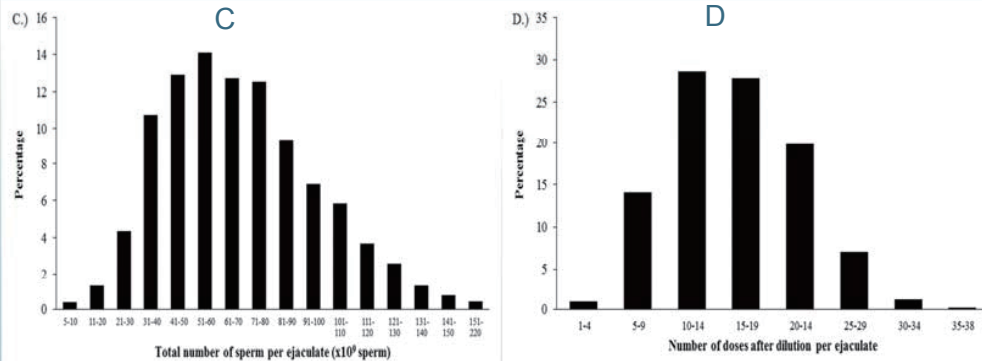


Figure 1 Frequency distribution of the semen production of boars kept in EVAP system house in Thailand (C.) total number of sperm per ejaculates (D.) number of semen doses after dilution per ejaculate

Table 2 Semen production of boars, in different seasons, kept in EVAP system housing in Thailand (LSM \pm SEM)

Variable	Season		
	Cool	Hot	Rainy
Number of ejaculates	546	713	611
Semen volume (ml)	267.8 ^a	248.3 ^b	254.9 ^b
Sperm conc. ($\times 10^6$ sperm/ml)	295.5 ^a	285.1 ^b	276.3 ^c
Total sperm/ ejaculate ($\times 10^9$ perm)	73.7 ^a	66.1 ^b	66.2 ^b
Semen dose/ ejaculate	16.0 ^a	15.0 ^b	14.9 ^b

Table 3 Semen production in boars with different breeds kept in EVAP system housing in Thailand (LSM± SEM)

Variables	Boar breed			
	D	L	Y	PC
No. of ejaculate	466	499	685	220
Semen volume (ml)	243.5	280.0	264.2	240.5
Sperm conc. (x10 ⁶ sperm/ml)	289.3	252.2	250.3	350.7
Total sperm/ ejaculate (x10 ⁹ sperm)	68.8 ^{ab}	66.4 ^{ab}	58.0 ^b	81.6 ^a
Semen dose/ ejaculate	14.8 ^{ab}	14.3 ^{ab}	13.8 ^b	18.3 ^a

Discussion

SEASON	BREED
<ul style="list-style-type: none"> The highest sperm concentration, semen volume and total sperm per ejaculate were found in cool season ($P < 0.05$) (our study) The lowest semen volume was observed in hot season ($P < 0.05$) (our study) Semen production did not differ significantly between boars kept in EVAP and those kept in a conventional open housing system (Suriyasomboon et al., 2005) The semen volume and total sperm production per ejaculation were lowest during hot season (Suriyasomboon et al., 2005) 	<ul style="list-style-type: none"> Total number of sperm per ejaculate and number of extended semen dose per ejaculate in PC-hybrid boars were higher than Yorkshire ($P < 0.05$) (Table 3) (our study) The seasonal variation effect was most pronounced in purebred Duroc and Pietrain boars rather than LY and PD crossbred boars (Tretipskul et al., 2012)

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Conclusions

- Seasons influence the semen traits of boars kept in EVAP system in Thailand
 - Semen volume, sperm concentration and total sperm per ejaculate in cool season > hot and rainy seasons
- Breed of boar significant influence the semen traits
 - Total number of sperm per ejaculate and number of extended semen dose per ejaculate
 - PC-hybrid > Yorkshire
- During hot season, the management of boar stud and quality feed intake should be improved to reduce the deleterious effect of heat stress on the boar semen production.

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