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Reproductive Performance of sows in Thailand

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Abstract

The objective of this investigation was to compare the piglets production and reproductive performance of sows reared in the intensive farm and the small traditional farms in the same area. Furthermore, the comparison between the intensive farms from different regions were also made. The determination of the influences of season and parity to litter size, gestation length and interval from weaning to oestrus were also included.

The piglets production and sow performance in the well-managed intensive farm is better than those of the small farms. There was no significant difference in term of piglets production among the regions. The number of piglets born, born alive and weaned were relatively lesser than those average in Europe. The gestation length and litter size were affected by season. Especially the sows that farrowed during the summer months had gestation length significantly shorter than the other months, while mating the sow during the summer month gave significantly smaller litter size. The interval from weaning to oestrus when weaned piglets

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in the summer months had a tendency of prolonging the interval. Primiparous sows had smaller litter size and had longer interval from weaning to oestrus than those multiparous sows. In conclusion, the well-managed farm had a better outcome than the traditional small farms. Parity and season had the influence on litter size and interval from weaning to oestrus as well as summer months caused a shorter gestation length in the sows.

Introduction

Pork is an important source of protein for human consumption in Thailand. About 10,695 million bahts (40% of the total meat production) of pork production in Thailand during 1984 was reported (Office of Agri. Stat. of Thailand, 1985). Therefore, in the recent years, pig farming in Thailand has gradually increased from backyard raising to a more commercialized and industrialized farming.

The commercial farms have successfully transferred the proven technology such as optimization of feed ration, management program, preventive measurement of the diseases, and etc. Despite this situation, however, the majority of pigs are still reared on small farms

where they form an integral component of the traditional small farm system involving animals and mixed cropping.

This report focuses on the reproductive performance of sows reared in a large intensive farm comparing to the small traditional farms in the same area. The performance of the sows in the (advanced) commercial farms in different regions of Thailand are also compared with each other.

Materials and Methods

Experiment 1

A standard commercial herd and a group of small farms were used in this study. It comprised the data of 250 sows from a commercial herd and 54 farms randomly sampling from two villages (20% of the total

pig population in the villages) of the same province (Nakhon Pathom).

The standard commercial herd :

The farm in this study comprised 250 cross-bred gilts or sows (Yorkshire X Landrace) that used Duroc boars for breeding. The purpose of this farm was to produce piglets for fattening. There were three units in the farm : breeding and gestation unit, farrowing and lactating, and postweaning units. Every units had slatted floor with good ventilation (double roof system) and water sprinkle on top of the roof. All units was 25 meters apart from each other and there were 2 grouping pens for postweaning sows between the breeding and farrowing units.

Breeding and gestation unit :

This unit contained 240 individual pens for gilts or sows with 30 stalls in a row. Ten boars were kept individually in the middle of the unit. These individual pens (2X3 m per boar) were also used for mating.

Farrowing and lactating units :

After 100 days of pregnancy, the sows were moved to the farrowing unit. This unit comprised 4 compartments, each compartment had 12 farrowing crates. The sows farrowed and nursed their piglets in this unit and they were moved for grouping to the postweaning pens 4 weeks after parturition.

Post-weaning unit :

This unit comprised 5 compartments, each compartments had 12 pens and each pen housed about 15 piglets.

Management and feeding :

This farm used the standard commercial feed from a feeding company. Prior to mating, vaccination program for Swine Fever and Foot-Mouth Diseases were carried out and deworming program was also made. Heat detection was performed an by experience herd man with an aid of a boar. Two times mating were practiced with 8-12 hr. interval. Non-returned rate was assumed as pregnant and subsequently confirmed by ultrasonic detector

on day 30-35 of pregnancy. Four weeks before farrowing, Pseudorabies vaccine was administered twice with 2 weeks interval. After farrowing, caring of the newborn were intensively done (drying the body, cutting the needle teeth and umbilical cord, numbering and iron administration). The piglets were castrated when they were 7 days of age. The sow removed away on day 27 while the piglets were still left in the farrowing pen for another week. Brucellosis test was carried out twice a year both in boars and sows. The breeding record and evaluation were completed daily and monthly respectively. One year breeding data was used for retrospective study.

The small farms :

The data from fifty-four farms of 2 villages which had about 250 sows were collected. The farmers had no breeding record of the sows, however, by direct interview with the far-

mers subsequently the information could be drawn. Most of the pigs were reared under the easy-made sunshade or being tied under the tree. The animals were fed with variety of green forages such as banana leaves, water hyacinth, leucaena or rice bran. Lactating animals were given broken rice sometimes. No vaccination or deworming program was applied to these animals. The weaning age of the piglets was varied from 35-42 days. After farrowing, no intensive care of the newborn was performed. The travelling boar (the boar which travels around for servicing the gilts or sows) from other place was for used breeding. All piglets were sold after weaning to the fattening farms.

Analysis of the data : After data collection, Z-test was applied for comparison of these two groups (Snedecor and Cochran, 1980).

Experiment 2

This study comprised 7

commercial swine breeding farms from 3 regions; 3 from central and each 2 from North- Eastern and Eastern regions of Thailand respectively. All farms had similar management and feeding program as the commercial farm mentioned in experiment 1. Altogether there were around 3,000 litters in this investigation. The reproductive data sheets were provided and filled by the farmers in order to collect the information about the reproductive performance of sows during one year period both for retrospective and prospective studies. The data sheet comprised the number of sow, breed, age, litter number, date of mating and farrowing as well as weaning, detail about the piglets born and weaned were also recorded. The data were obtained during 1984-1985 and analysed for piglets production, seasonal variation and parity performance by using computer at the Computer Center, Chulalongkorn University. During the investigation period there was no infectious diseases or any

severe problems in any of these farms.

Results and Discussion

Experiment 1

The comparison of the reproductive performance of the sows between an intensive farm and small farms presented is in table 1. The age of the first mating in the intensive herd had a tendency to be of the younger age than the small farms. However, both groups had quite a late mating age, this might be due to the management of the intensive farm which had the regulation of preventive measure-ment such as vaccination program, deworming and brucellosis test before mating. While poor nutrition and management might be the causes for the late mating age in the gilts raised by the small farms.

Analysis of the data :

The information was presented in term of mean \pm SD. Chi-square test was used for comparison of seasonal variation and parity performance (Snedecor and Cochran, 1980).

Means of the gestation length in the two groups of the animals were also presented in table 1. The pigs from the small farms had a little longer gestation period than those from

the commercial herd ($p < 0.05$). However, the ranges of the means of these two groups were corresponded with the previous report (Huges and Varley, 1980).

Table 1 Comparison of the reproductive performance of sows in a commercial farm (A) and small farms (B).

	Age of the 1st mating (months)	Gestation length (days)	Farrowing rate (%)	lactation length (weeks)
	Mean \pm SD (n)	Mean \pm SD (n)		
A	10.1 \pm 1.9 (225)	114.2 \pm 1.9 (257)	82.7	4
B	10.7 \pm 2.3 (42)	115.6 \pm 4.5 (54)	90.7	5-6

A tendency of lower farrowing rate in the intensive farm was observed, but the difference was not significant. Raising pig in total confinement may cause more stress than those of the loose housing and had the influence on fertility

and conception. The interval from weaning to first oestrus was longer in the sows from the intensive herd. This might be due to a shorter lactation length which was applied in the intensive herd. Shorter lactation length can induce an

adverse effect by prolonging the interval from weaning to oestrus (Kunavongkrit, 1984). However, 80-90% of sows from both groups came in oestrus 6-9 days after weaning which is in accordance with other report (Einarsson and Settergren, 1974). The number of litter per sow per year in the intensive and small holder farms were 2.02 and 1.98, respectively. The findings of this study were lower than those proposed by Tomes and Nielsen (1982). The reason might be due to the management, feeding and environmental variation in Thailand which is different from those in the temperate countries.

The number of piglets born and weaned increased in accordance to the litter number both in the standard and small farms. However, the first and second litter of the commercial farm had piglets born and weaned significantly higher than those of the small holder farms, but no difference in the third litter (table 2). The results are in harmonious with the previous

report (Perry, 1954 cited by Hughes and Varley, 1980) which reported that the litter size and ovulation rate increased from the first to the fourth litter. The losses of the piglets during pregnancy and parturition (stillborn) were 4.5 and 6.3% for the commercial and small farms respectively. These findings are in accordance with that reported by Fahmy et al. (1978), cited by Hughes and Varley 1980. The loss of piglets born alive in this study was 10.5% and 11.3% for the commercial and small farms. This is better than those reported by Hughes and Varley (1980). The good management and nutrition are important factors for the survival of piglets during gestation, parturition and lactation as shown in the present study. The average of litter size, percentage of stillborn and loss during lactation the in well managed farm was far better than those from the small farm that lead to the higher average of piglets per sow per year in

the commercial farm than the small farms (20.1 VS 16.7 piglets/sow/year).

In conclusion the reproductive performance of sows in the well managed farm is better than those of the small farms. However, the findings being shown in the present study re-

presented the reproductive performance of sows in one province of Thailand only.

Experiment 2

Data from a total of 3013 litters from 7 farms of 3 different regions in Thailand were analysed.

Table 2 Comparison of piglets production between a commercial farm (A) and small farms (B).

	Average no. of piglets born alive in different litters			Stillborn (%)	Average no. of piglets weaned in different litters			Loss during Lactation (%)
	1 st	2 nd	3 rd		1 st	2 nd	3 rd	
A	9.7 ^a	9.9 ^a	10.4 ^c	4.5	8.5 ^a	8.9 ^a	9.2 ^c	10.5
B	7.6 ^b	8.8 ^b	9.6 ^d	6.3	6.7 ^b	8.0 ^b	8.6 ^d	11.3

a and b differ significantly ($P < 0.05$)

c and d not significantly different ($P > 0.05$)

The average parity of those sows was 3.6 ± 2.4 . The piglets production (average total born, born alive and weaned) and average

lactation period of the farms in each were region presented in table 3. There was no significant difference between the

production of piglets among the regions. This might be due to the management of each farm which was similar to each other. Therefore, the following results and discussion will be based on the findings of the three regions and treated as the sow performance in Thailand. The average piglets production

in this study were 9.9 ± 2.8 , 9.5 ± 2.7 and 8.5 ± 2.2 for total born, born alive and piglets weaned, respectively. The results were lesser than those of the "average" in the United Kingdom (English *et al.*, 1982) but was similar to the results of the intensive farm in experiment 1.

Table 3 Production of the piglets in different regions (mean \pm SD) of Thailand.

Region (Litters)	Number of piglets				
	Average parity	Average total born	Average born alive	Average weaned	Lactation period (days)
1 (1044)	3.2 \pm 1.7	9.9 \pm 2.7	9.5 \pm 2.6	8.5 \pm 2.3	30.7 \pm 5.2
2 (368)	2.4 \pm 1.1	9.6 \pm 2.5	9.1 \pm 2.3	8.5 \pm 2.4	26.9 \pm 5.4
3 (1601)	3.9 \pm 2.5	10.1 \pm 2.5	9.6 \pm 2.6	8.6 \pm 2.1	32.5 \pm 3.9
Total(3013)	3.6 \pm 2.4	9.9 \pm 2.8	9.5 \pm 2.7	8.5 \pm 2.2	30.9 \pm 5.2

Region 1 = Nakhon Pathom 3 farms

Region 2 = Chonburi 2 farms

Region 3 = Udorn, Khon-Kaen 2 farms

The average gestation length from 2965 litters was 114.2 ± 2.0 days which is in accordance with the previous report (Britt *et al.*, 1983). The ratio of male and female piglets ($n = 3013$ litters) was 1.1:1.0 and the ratio of farrowing during night and day was 1.03 : 1.0. ($n = 1592$ litters). The results seemed to have

more male piglets born than female but the difference was not significant. Concerning the time of farrowing, the farmers used to believe that the sows farrowed more during the night, but from the present study, the result showed no difference. This might due to the fact that day length does not change much in different seasons in Thailand.

Table 4 Gestation length and litter size of sows farrowing in the summer month (March - May) and other seasons.

	Gestation length(days)	Litter size (piglets)
Summer	113.6 ± 2.5^a	9.6 ± 2.9^c
(Litters)	($n = 673$)	($n = 802$)
Other season	114.2 ± 2.0^b	10.1 ± 2.7^d
(Litters)	($n = 2292$)	($n = 2093$)

a and b differ significantly ($P < 0.05$)

c and d differ significantly ($P < 0.01$)

The comparison of the gestation length when the sows farrowed in different seasons was shown in table 4. The sows farrowed during summer months (March-May) had a significantly shorter gestation length than those that farrowed during other periods (113.6 ± 2.5 days VS 114.2 ± 2.0 days). The high temperature during the summer months may act as stressor that contributed to a shorter gestation period.

Litter size during the summer months was significantly smaller than those that farrowed in the other months (9.6 VS 10.1 piglets). It has been known that heat stress may cause an-oestrus or an early embryonic

loss (Love, 1978) and stress around the time of mating resulting in an endocrine imbalance in sows (Hennessy and Williamson, 1983). However, it is reasonable to suggest that many factors such as the social environment, management, nutrition and semen quality during the summer months might play an important role that contributes to stress of the sows before and during mating as well as in an early pregnancy. The outcome was noticeable as sows that mated during the summer months had litter size lesser than 10 was 60.5% compared to 54.5% when mated in other months. (table 5).

Table 5 Litter size and interval from weaning to oestrus when mating and weaning during the summer months (March - May) and other months.

No. of litter (%)	Mating (Litter size < 10 piglets)	Weaning (Interval from weaning - oestrus within 21 days)
Summer	60.5 ^a (n = 805)	88.7 (n = 504)
Other months	54.5 ^b (n = 2153)	90.9 (n = 2012)

a and b differ significantly (P < 0.01)

There was a tendency of a fewer sows came in oestrus with in 21 days after weaning when weaned during the summer months than those weaned in the other months (88.7% VS 90.9%), but the difference was not significant (table 5.)

The effects of parity to gestation length and litter size was shown in table 6. The age

of the sow had no influence on the gestation length in this study which is the same as the previous report (Bonte *et al.*, 1980). But the primiparous sows had a significantly smaller litter size ($P < 0.01$) than the multiparous sows (9.1 ± 2.6 VS 10.1 ± 2.8). This is in accordance with other report (Love, 1979).

Table 6 Comparison of gestation length and litter size between the primiparous and multiparous sows. (mean \pm SD)

	Gestation length (days)	Litter size (piglets)
Primiparous (Litters)	114.1 ± 2.1^a (n = 504)	9.1 ± 2.6^c (n = 544)
Multiparous (Litters)	114.1 ± 2.1^b (n = 2346)	10.1 ± 2.8^d (n = 2315)

c and d differ significantly ($P < 0.01$)

The significantly different between primiparous and multiparous sows in term of the percentage of sows having piglets lesser than 10, was shown in table 7 (69.2% and 53.0% for primiparous and multiparous

sows, respectively). The lower number of ovulations and higher percentage of early embryonic mortality in primiparous sows might be the reason for this effect (Love, 1979).

Table 7 Comparison of litter size and interval from weaning to oestrus between primiparous and multiparous sows.

No. of litter (%)	Litter size <10 piglets	Interval from weaning to oestrus < 21 days
Primiparous (Litters)	69.2 ^a (n = 581)	82.7 ^c (n = 474)
Multiparous (Litters)	53.0 ^b (n = 2362)	92.3 ^d (n = 2029)

a and b differ significantly ($P < 0.01$)

c and d differ significantly ($P < 0.001$)

The primiparous sows that had interval from weaning to oestrus lesser than 21 days was significantly fewer than those multiparous sows (table 7). This is in accordance with Einarsson and Settergren (1974) who reported that multiparous sows had shorter interval from weaning to oestrus and had more sows came in oestrus within 21 days than primiparous sows.

In conclusion different regions in Thailand did not make any different in piglets production. But the seasonal different played an important role in piglets production and sow performance such as gestation length, litter size and interval from weaning to oestrus. Furthermore, the parity of the sows also affected the litter size and interval from weaning to oestrus.

Further studies are needed to determine the effects of season in tropical countries, especially Thailand, on "Summer problem" to relate the summer months and semen quality in boar, heat stress and ovulation rate in sows, and how to improve and prevent such problems by creating good and proper management during the "Problems" periods. If this can be overcome, the reproductive performance of sows and piglets production will be much better than what we have now.

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บทย่อ

สมรรถภาพการสืบพันธุ์สุกรในประเทศไทย

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บทคัดย่อ

การศึกษานี้มีจุดมุ่งหมายที่จะศึกษาสมรรถภาพการสืบพันธุ์สุกรในประเทศไทย โดยได้เปรียบเทียบการผลิตรายสุกรและสมรรถภาพทางการสืบพันธุ์ระหว่างฟาร์มสุกรขนาดใหญ่และฟาร์ม หรือผู้เลี้ยงรายย่อย นอกจากนี้ยังได้ศึกษาเปรียบเทียบระหว่างฟาร์มสุกรพ่อแม่พันธุ์ขนาดใหญ่ ในภูมิภาคต่าง ๆ ของประเทศไทย โดยเน้นผลกระทบของฤดูกาลและจำนวนครอกต่อผลผลิตรายสุกร และสมรรถภาพทางการสืบพันธุ์

จากการศึกษานี้พบว่าผลผลิตรายสุกรในฟาร์มขนาดใหญ่สามารถผลิตได้มีประสิทธิภาพมากกว่าฟาร์มหรือผู้เลี้ยงขนาดเล็ก แต่ไม่พบความแตกต่างกันระหว่างฟาร์มขนาดใหญ่ในภูมิภาคต่าง ๆ ในประเทศ อย่างไรก็ตามผลผลิตรายสุกรทั้งแรกคลอด, แรกคลอดมีชีวิต และหย่านมมีจำนวนน้อยกว่ามาตรฐานยุโรปเล็กน้อย และพบว่าฤดูกาลมีผลกระทบต่อระยะการตั้งท้องและขนาดครอก โดยเฉพาะอย่างยิ่งกำหนดคลอดในฤดูร้อนทำให้ระยะการตั้งท้องสั้นกว่าเดือนอื่น ๆ และผสมพันธุ์ในฤดูร้อนจะให้ขนาดคอกเล็กกว่าในเดือนอื่น ๆ การเป็นสัดหลังหย่านมในฤดูร้อนจะเป็นช้ากว่าในฤดูอื่น ๆ แม่สุกรท้องสาวให้ลูกต่อครอกน้อยกว่า และเป็นสัดหลังหย่านมช้ากว่าแม่สุกรหลายท้อง

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