

## 8. Swine Research

### (1) Study of estimating growth curve and correction factor about performance test in pigs

These studies were conducted to estimate growth curve parameters and adjustment factor at 35kg tested body weights on the basis of Duroc, Landrace and Yorkshire breeds raised at the National Institute of Animal Science. The results obtained in these studies are summarized as follow. The Growth parameters of body weight were estimated within each breed by using Gompertz models. The parameters of A, b and k of Gompertz model were 285.0, 5.02 and 0.012 in male of Durocs breed, 257.9, 4.75 and 0.0099 in Landraces, 178.0, 4.80 and 0.0135 in Yorkshires, respectively. The adjustment factors estimated using the growth curve were 35.3 in days to 35kg , 52.9 in days to 90kg and 47.1 in days to 105kg, respectively.

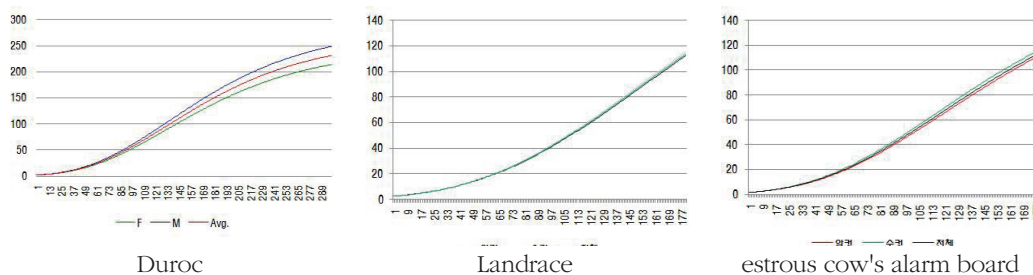


Fig. 8-1. Estimated growth curve using Gompertz model in pig

Table 8-1. Statistics on correction factor at 35kg performance test weight.

Sex	No.	Variables	Mean	S.D	Min.	Max.
F	3,177	Correction Factor at 35kg	35.5	5.52	18.1	62.3
		Days to start	77.0	5.32	69.0	101.0
		Weight at start	30.9	2.84	24.9	47.4
M	3,212	Correction Factor at 35kg	35.0	5.51	17.2	62.0
		Days to start	76.7	5.15	69.0	101.0
		Weight at start	30.9	2.77	25.0	46.7
Total	6,389	Correction Factor at 35kg	35.3	5.52	17.2	62.3
		Days to start	76.8	5.23	69.0	101.0
		Weight at start	30.9	2.80	24.9	47.4



## (2) Effects of estrus synchronization regime on reproduction performance and estrus in gilts

This study was conducted to determine the effects of altrenogest, PMSG, GnRH or hCG treatments on estrus synchronization and reproduction performance in gilts. In the experiment 1, the pubertal gilts were allocated to three groups, all synchronized with altrenogest (Al) and PMSG. Control group (Al+PMSG-Detect) was inseminated twice at detected estrus, Treatment 1 (Al+PMSG+GnRH-Detect) and Treatment 2 (Al+PMSG+hCG-Detect) administrated GnRH or hCG at 72 hr after the end of PMSG treatment, respectively. In Treatment 1, there was less variation in duration of estrus when compared with other treatment groups. However, estrus detection rate and reproduction performances were lower than other treatment groups. In the experiment 2, we determined the effect of estrus synchronization and artificial insemination regime (estrus-detected AI or Fixed-time AI) in gilts on reproduction performance. The pubertal gilts were allocated to three groups, all synchronized with altrenogest (Al) and PMSG. Control group (Al+PMSG-Detect) was inseminated twice at detected estrus, Treatment 1 (Al+PMSG+hCG-Detect) administrated hCG at 72 hr after the end of PMSG treatment. Treatment 2 (Al+PMSG+hCG-Fixed) administrated hCG at 72 hr after the end of PMSG treatment and inseminated twice at 24 hr and 36 hr after hCG administration (Fixed-time AI). Reproduction performances in Treatment 2 were similar to that of the other treatment groups. These results indicate that a treatment with 20 mg altrenogest per day per animal, followed by 1,000 IU PMSG and 750 IU hCG and the use of a scheduled fixed-time insemination are appropriate to synchronize estrus and reduce the variation of estrus expression duration in gilts.

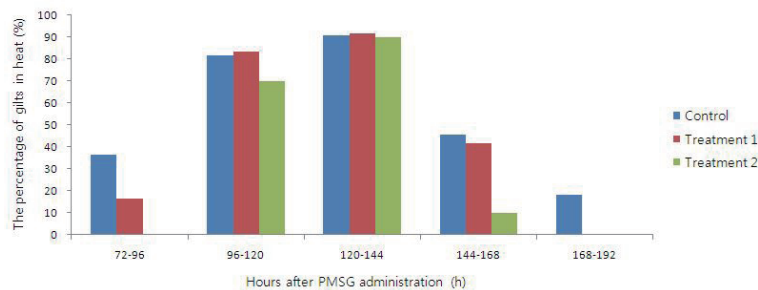
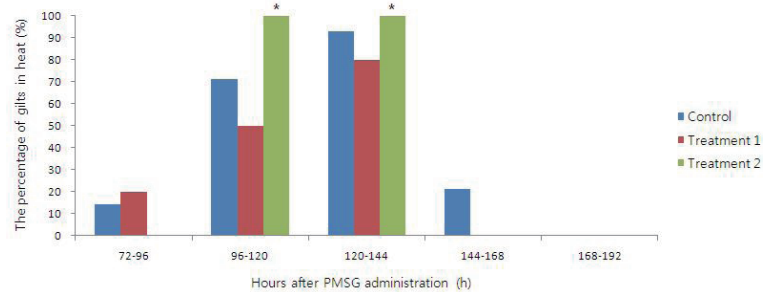


Fig. 8-2. Effect of treatments of estrus synchronization hormones on estrus pattern in gilts. (Control; Alt+PMSG-Detect, Treatment 1; Alt+PMSG+GnRH-Detect, Treatment 2; Alt+PMSG+hCG-Detect)

**Table 8-2. Effect of estrus synchronization and artificial insemination regime on reproduction performances**

Treatments	No. of gilts inseminated	Conception		Farrowing		Litter size	
		Head	%	Head	%	Total	Alive
Alt+PMSG-Detect (Control)	11	10	90.9	9	81.8	10.9±3.1	8.9±3.2
Alt+PMSG+GnRH-Detect (Treatment 1)	12	11	91.7	11	91.7	10.0±2.4	8.7±2.3
Alt+PMSG+hCG-Detect (Treatment 2)	10	5	50.0	4	40.0	7.8±3.4	6.5±2.6

PMSG (1000IU i.m., Daesung), hCG (75IU i.m., Intervet)  
 Detect; Artificial insemination at 12 hr and 24 hr after allowing mounting



**Fig. 8-3. Effect of treatments of estrus synchronization hormones on estrus pattern in gilts.**  
 (Control; Alt+PMSG-Detect, Treatment 1; Alt+PMSG+hCG-Detect, Treatment 2;  
 Alt+PMSG+hCG-Fixed)

\* Treatment 2 was inseminated by Fixed-time AI without estrus detection.

**Table 8-3. Effect of estrus synchronization and artificial insemination regime on reproduction performances in gilts**

Treatments	No. of gilts inseminated	Conception		Farrowing		Litter size	
		Head	%	Head	%	Total	Alive
Alt+PMSG-Detect (Control)	14	11	78.6	10	71.4	10.5±1.7	9.7±2.0
Alt+PMSG+hCG-Detect (Treatment 1)	8	4	50.0	4	50.0	9.5±3.1	8.5±1.3
Alt+PMSG+hCG-Fixed (Treatment 2)	10	8	80.0	6	60.0	9.3±1.9	8.2±0.8

PMSG (1000IU i.m., Daesung), hCG (75IU i.m., Intervet)  
 Detect; Artificial insemination at 12 hr and 24 hr after allowing mounting  
 Fixed; Artificial insemination at 24 hr and 36 hr after hCG administration

### (3) Effects of outdoor feeding on feces composition and productivity in sows

The objective of this study was to investigate the effects of feces' composition and performance by feeding of outdoor sow. Sixteen sows were assigned to two treatment groups (8 sows per treatment) from 5 weeks after pregnant. Sows were fed outdoor until 10 days before the farrowing. Body weight and backfat thickness of sows were not affected between CON and OUD at initial and final points. p-cresol was not affected between CON and OUD at initial point but decreased in OUD than in CON at final point. Skatole was also not affected between CON and OUD at initial point but decreased in OUD than in CON at final point. In the reproduction, total number born, stillborn, number of weaned, mortality and weight at 1 day were not affected between CON and OUD. The results indicated that the outdoor to sows exposure may improve the p-cresol and skatole of sow's feces and reproduction.

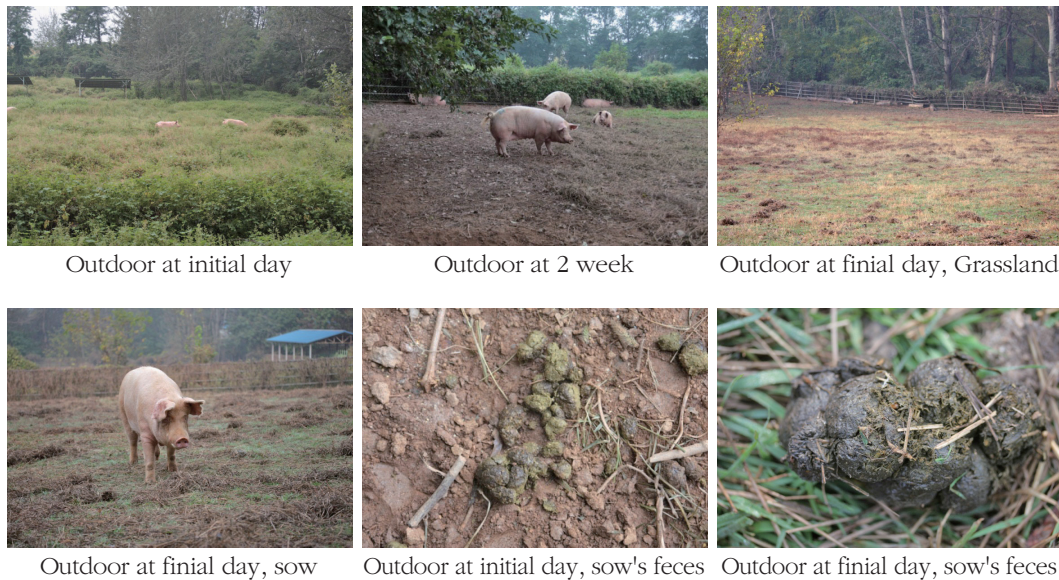


Fig 8-4. Change of grassland and feces by sow in outdoor

Table 8-4. Effect on weight and backfat of sow by outdoor

Time	Items	CON	OUT
Initial	Weight, kg	202,13	200,00
	Backfat, cm	1,78	1,78
Final	Weight, kg	226,83	225,60
	Backfat, cm	2,01	2,00

Table 8-5. Effect on p-cresol, indole, skatole of sow's feces by outdoor

Time	Items	CON	OUT
Initial	p-Cresol	1,78	1,76
	Indole	0,66	0,79
	Skatole	0,69	0,81
Final	p-Cresol	1,63	1,14
	Indole	0,70	0,82
	Skatole	0,90	0,67

Table 8-6. Effect on reproduction of sow by outdoor

Items	CON	OUT
Total number born	9	9
Number stillborn	1,00	0,67
Number of weaned	7,00	7,83
Mortality, %	21,93	10,06
Weight 1 day, g	1,588	1,593