

母豬於懷孕前期及後期不同飼料餵量對繁殖及 仔豬生長之影響⁽¹⁾

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摘 要

本研究旨在探討母豬於懷孕前期及懷孕後期之不同飼料餵量對繁殖性能及仔豬生長的影響。78 頭第二產母豬依發情順序逢機分成四組，母豬於配種後至懷孕期第 30 日之懷孕前期，分別日餵 2.0 kg 或 3.0 kg 懷孕期飼料，爾後，所有母豬皆維持日餵 2.0 kg，懷孕期第 91 日至分娩之懷孕後期，則前述兩飼料餵量組母豬分別再區分為日餵 2.4 kg 或 3.0 kg 等飼料餵量組。試驗期間測定母豬於懷孕期及哺乳期體重及背脂厚度變化，出生窩仔數及活仔豬數、哺乳期母豬體重及背脂厚度變化、仔豬增重以及育成率等性狀。試驗共完成第二產 74 胎以及第三產 68 胎之母豬懷孕期及哺乳期之繁殖性能測定。結果顯示，母豬於懷孕前期及懷孕後期之不同飼料餵量，對分娩窩仔數及出生活仔數有顯著的（ $P < 0.05$ ）影響，而母豬於懷孕前期及後期皆餵飼 3.0 kg 者，則分娩窩仔數以及出生活仔數顯著較其他各組為大，然而離乳仔豬數及哺乳期之仔豬育成率各處理組間差異不顯著，仔豬出生重以懷孕前期及後期皆日餵 2.0 kg 者最重，然而哺乳期之仔豬增重以母豬於懷孕前期及後期皆餵飼 3.0 kg 者顯著較輕，顯示母豬於懷孕前期及後期皆增加飼料餵飼量並無法裨益哺乳仔豬生長性能。

關鍵詞：母豬、懷孕期、飼料餵量、繁殖性能、仔豬生長。

緒 言

養豬農戶為避免母豬過度肥胖，引起繁殖障礙等管理上困擾，咸信飼養母豬應保持體態輕盈，因而懷孕期間以每頭母豬日餵 1.8-2.0 kg 懷孕期飼料，甚或更低的做法很普遍，造成母豬體型纖瘦；另加上近期針對高瘦肉率豬之選拔，使得母豬群體組成普遍偏瘦。母豬過於瘦弱的結果，導致出生仔豬弱小及死產比例偏高，且母豬離乳後再發情困難，淘汰率增加，影響豬場正常運作（廖與徐，1987）。Cromwell *et al.*(1989)從母豬懷孕期第 90 日起至分娩期間，每日飼料餵量由 1.8 kg 增至 3.16 kg，可增加出生及離乳活仔豬數以及離乳時體重。由於懷孕前期的高熱能供給可能造成豬胚早期死

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亡 (Britt *et al.*, 1992)，另懷孕後期增加餵量可增加仔豬出生重及活仔數 (廖等, 1987)。因此，本研究的目的在探討母豬於懷孕前期及後期等不同懷孕期階段，不同飼料供餵量對出生窩仔數及哺乳期仔豬生長存活之影響，冀望可作為懷孕期母豬飼養管理之依據。

材料及方法

I. 試驗動物及方法

- 1、以 78 頭 LY 雜交第二產母豬作為試驗豬群，供試母豬自配種至配種後 30 日期間，每日每頭分別餵飼 2.0 kg 或 3.0 kg 懷孕期飼料，此兩飼料餵量組母豬於配種後第 31 日至懷孕期第 90 日期間，日餵 2.0 kg，懷孕期含粗蛋白質 13% 和代謝能 3130 kcal/kg，飼料組成列於表 1。
- 2、自懷孕期第 91 日至分娩期間，懷孕前期之兩飼料餵量組再分別分為日餵 2.4 kg 及 3.0 kg 兩餵量組，共形成四種飼料餵量組合，測定母豬於懷孕期及哺乳期體重及背脂厚度變化，出生窩仔數及活仔豬數以及哺乳期母豬體重及背脂厚度變化，仔豬增重以及育成率等仔豬之生長性能。
- 3、母豬分娩後，以哺乳期飼料任食，此飼料含粗蛋白質 15 % 和代謝能含量為 3270 kcal/kg，評估哺乳仔豬之增重及離乳時存活率。

II. 統計分析

試驗所收集資料以統計分析系統(SAS, 1999)分析之，並以一般線性模式(General Linear Model, GLM)作單向變方分析，以個別母豬為試驗單位，以飼料供餵量組合作為處理組別，處理間差異則以最小均方平均值 (Least square mean) 作檢定。

結果與討論

本試驗共計完成第二產母豬 74 頭及第三產母豬 68 頭完成懷孕前期及後期之飼料餵量對繁殖性能之影響測定。結果顯示，母豬配種時體重 (136 vs 171 kg)、分娩時體重 (167 vs 193 kg)、離乳體重 (154 vs 185 kg) 以及懷孕期增重 (30.5 vs 22.1 kg)、哺乳期失重 (11.4 vs 7.3 kg) 等性狀，隨母豬年齡增長而自然增加外，其餘諸測定性狀未有顯著效應，因此將二產次及第三產次之資料合併處理。母豬於懷孕前期及後期不同餵飼量之組合，未影響母豬於懷孕期間以及哺乳期間之體重及背脂厚度變化 (表 2)。表 3 之結果顯示母豬懷孕前期及後期之不同飼料餵量，對分娩窩仔數及出生活仔數，有顯著的 ($P < 0.05$) 影響，母豬於懷孕前期及後期皆餵飼 3.0 kg 者，則分娩窩仔數及出生活仔數顯著較其他各組為大。Liao and Veum (1994) 於第一產母豬配種後第 3 至 30 或 24 日間，分別每頭每日供給 8.1 及 5.4 Mcal 代謝能，結果發現，配種後第 30 日之豬胚存活率，並未因懷孕前期餵飼較高代謝能，而有減低現象。有關懷孕期第一個月之供餵量和胚胎存活之關係，亦需考量多種影響因素，諸如高熱能供餵量會造成懷孕前期豬胚死亡 (Dyck and Strains, 1983; Britt *et al.*, 1992)，或反而獲得較高胚存活率 (Rozeboom *et al.*, 1993) 或無影響胚存活者 (Dyck, 1991; Pharazyn *et al.* 1991; Cassar and King, 1992)。至於懷孕早期之飼料熱能供餵量影響胚存活率，則需考量高熱能供餵量之 (1) 開始供餵時間，(2) 供餵時間長短，(3) 使用初產或經產母豬，(4) 供餵量之多寡等因素。Pharazyn *et al.* (1991) 指出在母豬發情時或於配種前 10-14 天增加餵飼量，可增加排卵率 (催情效果)，但也增加胚死亡率，然而離乳仔豬數及哺乳期之仔豬育成率，則各處理組間並無差異存在。仔豬出生重以

懷孕前期及後期皆餵飼 3.0 kg/d 者顯著地 ($P < 0.05$) 低於兩期分別餵飼 2.0, 2.4 kg/d 者。本試驗懷孕前期及後期皆日餵飼 3.0 kg 者, 仔豬離乳體重及哺乳期之仔豬增重, 反而較母豬於懷孕前期及後期皆餵飼 2.4 kg/d 者顯著地 ($P < 0.05$) 較小 (表 3)。近期選育之母豬泌乳能力已有增進, 因此哺乳仔豬之增重大, 母豬於懷孕前期及後期皆餵飼 3.0 kg 者, 雖然仔豬出生體重較輕, 然由於其出生活仔數顯著較多, 因此造成泌乳負擔較大。本試驗於哺乳期每日飼料攝食量各組間並無差異, 顯示該組並未比其他各組母豬攝食較多飼料, 母豬之哺乳期失重明顯較大, 顯示其分解自身體組織以供泌乳之所需的量亦較明顯。縱如此, 哺乳期之仔豬增重, 亦明顯比母豬於懷孕期期日餵 2.0 kg 及後期日餵 2.4 kg 來得小。母豬於第二產次及第三產次階段, 從配種到配種後 30 日期間日餵 2.0 kg, 懷孕期之 31 日至 89 日間日餵 2.0 kg, 懷孕期之 90 日至分娩日餵 2.4 kg, 即可得到較大的哺乳期之仔豬增重。廖等人 (2004) 增加母豬懷孕期 91 日至分娩期間之飼料餵量由 2.0 kg 至 2.4 kg 或 2.8 kg, 可增加畜試黑豬分娩窩仔數 ($P < 0.1$)、出生活仔數 ($P < 0.05$) 以及有增加出生仔豬重的趨勢, 則和本研究於懷孕後期增加餵飼量至每日每頭母豬 2.4 kg 飼料之結果相同。

表1. 懷孕期及哺乳期飼糧組成

Table 1. The compositon of diets in gestation and lactation period

	Gestation period	Lactation period
Ingredient, %		
Yellow corn	62.8	64.7
Soybean meal, 44% C.P.	11.0	19.0
Wheat bran	20.0	10.0
Limestone, pulverized	1.0	1.0
Dicalcium phosphate	1.4	1.4
Salt	0.5	0.5
Vitamin premix ^a	0.15	0.15
Mineral premix ^b	0.1	0.1
Molasses	3.0	3.0
Choline chloride (50%)	0.06	0.02
Total	100	100
Calculated value		
Crude protein, %	13.1	14.9
Metabolizable energy, kcal/kg	3130	3270

a. Each kg of diet supplied as follows : Vitamin A, 6000 IU ; Vitamin D₃, 800 IU ; Vitamin E, 20 mg ; Vitamin K₃, 4mg ; Vitamin B₂, 4mg ; Vitamin B₆, 1mg ; Vitamin B₁₂, 0.02 μ g ; Niacin, 30mg ; Ca-pantothenate, 16mg ; Folic acid, 0.6mg ; Biotin, 0.01mg ; Choline chloride, 50 mg.

b. Each kg of diet supplied as follows : Fe, 140 mg ; Cu, 20 mg ; Mn, 4 mg ; Zn, 120mg ; I, 0.45mg。

表2. 母豬於懷孕前期及後期之不同飼料餵量對母豬增重及背脂厚度之影響

Table 2. Effects of level of feed provision during d 0 to d 30 postmating and d 91 to farrowing on body weight gain and backfat thickness of sows

	Feed level , kg/d				
Mating to d30 postmating	2.0	2.0	3.0	3.0	SEM
D91 postmating to farrowing	2.4	3.0	2.4	3.0	
Body weight, kg					
At mating	146.7	155.9	152.1	162.8	4.3
At farrowing	174.0	181.1	176.1	193.4	3.7
At weaning	164.7	170.9	163.9	179.3	4.6
Weight gain during gestation, kg	27.9	25.7	25.1	30.6	2.5
Weight loss during lactation, kg	8.75	9.62	9.70	14.1	2.40
Backfat thickness of sows, mm					
At mating	16.9	17.9	18.2	18.4	0.7
At farrowing	17.8	19.4	19.2	19.2	0.8
At weaning	17.0	17.7	18.1	17.5	0.7
Backfat thickness change during gestation, mm	0.9	1.7	1.1	0.8	0.7
Backfat thickness change during lactation, mm	-0.9	-1.63	-1.23	-1.79	0.6

Daily provision of gestation diet was 2 kg for each sow during d 31 to d 90 postmating.

表3. 母豬於懷孕前期及後期之飼料餵量對仔豬數及生長之影響

Table 3. Effects of level of feed provision during d 0 to d 30 postmating and d 91 to farrowing on litter size at farrowing and growth of piglets

	Feed level , kg/d				
Mating to d30 postmating	2.0	2.0	3.0	3.0	SEM
D91 postmating to farrowing	2.4	3.0	2.4	3.0	
Litter size	10.1	10.6	10.5	11.5	0.4
Number of piglet born alive	8.6	8.5	8.5	9.5	0.4
Piglets at weaning	7.3	7.7	7.8	8.1	0.5
Piglet					
Survival rate during lactation, %	84	91	89	86	3.3
Weight at farrowing, kg	1.39 ^a	1.38 ^{ab}	1.35 ^{ab}	1.30 ^b	0.03
Weight at weaning, kg	8.56 ^a	8.31 ^a	8.12 ^{ab}	7.71 ^b	0.24
Weight gain during lactation, kg	7.17 ^a	6.91 ^{ab}	6.76 ^{ab}	6.42 ^b	0.24
Sow feed intake during lactation, kg/d	4.97	5.19	5.04	5.07	0.12

a,b: Means at the same row with different superscripts differ significantly ($P < 0.05$).

參考文獻

- 廖宗文、徐阿里。1987。狹欄飼養泌乳母豬熱能供餵量對繁殖性能及哺乳性能的影響。畜產研究 20(2):17-25.
- 廖宗文、蔡金生、劉建甫、蘇天明。2004。增加母豬懷孕後期飼料餵量對畜試黑豬一號繁殖性能效果評估。畜產研究 37 (2) : 205-210。
- Britt, J . H., S. L. Whaley and V. S. Hedgpeth. 1992. Improvement of embryo survival by injection of vitamin A in gilts fed normal or high energy diets before and after mating. J. Anim. Sci. 70(Suppl.1) : 271.
- Cassar, G. and G. J. King. 1992. Effects of high energy feeding after mating on developmental uniformity and survival of porcine conceptuses. J. Anim. Sci. 70 (Suppl.1) : 266.
- Cromwell, G. L., D. D. Hall, G. E. Comb, O. M. Hale, D. L. Handlin, J. P. Hitchcock, D. A. Knabe, E. T. Kornegay, M. D. Lindlemenn, C. V. Maxwell and T. J. Prince. 1989. Effect of feed intake during gestation on the reproductive performance of sow. J. Anim. Sci. 67 : 3-14
- Dyck, G. W. 1991. The effect of postmating diet intake on embryonic and fetal survival, and litter size in gilts. Can. J. Anim. Sci. 71 : 675-681
- Dyck, G. W. and J. H. Strains. 1983. Postmating feeding levels effects on conception rate and embryo survival in gilts. Can. J. Anim. Sci. 63 : 579-585
- Liao, C. W. and T. L. Veum. 1994. Effects of dietary energy intake by gilts and heat stress from days 3 to 24 or 30 on embryo survival and nitrogen and energy balance. J. Anim. Sci. 72 : 2369-2377.
- Pharazyn, A. L., A. den Hartog, G. R. Foxcroft and F. X. Aherne. 1991. Dietary energy and protein intake, plasma progesterone and embryo survival in early pregnancy in the gilt. Can. J. Anim. Sci. 71 : 949-952
- Rozeboom, D. W., J. E. Pettigrew, G. D. Dial and J. E. Wheaton. 1993. Effect of pre and postbreeding dietary energy intake on ovulation rate, embryo number and percent embryo survival in gilts. J. Anim. Sci. Midwest Abst. #132, P. 67.
- SAS Institute. 1999. SAS User's guide: Statistics. 8th ed. SAS, Inc. Cary. NC.

Effects of level of feed provision during d0 to d30 postmating and d91 to farrowing on reproductive performance of sows and growth of piglets⁽¹⁾

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Abstract

The experiment was conducted to investigate the effect of level of feed provision during d 0 to d 30 postmating and d 91 to farrowing on the reproductive performance of sows and growth of piglets. A total of seventy-eight 2nd parity sows were used as experiment animals. Sows were allocated to two feed provision groups, i.e., 2.0 or 3.0 kg/d. during d 0 to d 30 postmating. From d 31 to d 90 postmating, all sows were provided daily with 2.0 kg of pregnant diet. From d 91 to farrowing, the previous feed provision groups were subdivided into 2 groups ,i.e., 2.4 or 3.0 kg/d. Four feed provison combinations were formed. The body weight gain and backfat thickness change of sows were measured. Effect of levels of feed provision during d 0 to d 30 postmating and d 91 to farrowing on litter size at farrowing and piglet growth in lactating period were determined also. Results showed that there was significant ($P < 0.05$) feed provision effect on the litter size at birth and live piglets. Sows provided with 3.0 kg/d during d 0 to d 30 postmating and d 91 to farrowing had larger litter size at birth and live piglets. There were no difference in litter size at weaning or survival rate during subsequent lactating period. Nevertheless, the weight gain of piglets during lactating period was reduced for sows fed 3.0 kg/d during d 0 to d 30 postmating and d 91 to farrowing when compared with the control group. In conclusion, sows fed 3 kg feed during d 0 to d 30 postmating and d 91 to farrowing could not benefit the piglet growth during lactating period.

Key words : Sow, Pregnancy, Feed provision, Reproductive performance, Piglet growth.

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