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Effects of some factors on mummification in pigs in Thailand

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Abstract

Data of 109 gilts and 351 sows at the Animal Science Farm, Chiangmai University, Thailand were analyzed in order to study the effects of parity, breed and climate on mummification in pigs. The results indicated no correlation between litter size and mummification rates whereas parities and breeds ($p < 0.05$) influenced this rate. The highest percentage of mummified pigs (7.1%) occurred in gilt and differed significantly ($p < 0.05$) from the results of sows in parities 2 and 3 but not significantly from results of sows in parities 4 to 9. Among breeds the prevalence of 8.8% found in pure bred Duroc (D) was considerably different from results by pure bred Landrace (L) and pure bred Large White (LW) but no difference was found between LW(D and LW(L ($p > 0.05$). Analysis indicated no climatic effect since the average number of mummified pigs per month within a year was not statistical different ($p > 0.5$). However, occurrence of mummification rate in summer (5.0%) and rainy season (4.9%) tended to be higher than in winter (3.8%).

Introduction

Mummification is a term applied to dead foetuses that have at least some calcium in their skeletons and are being dehydrated by absorption. In gestation age they range from approximately 35 days to within a few days before term. The foetuses tend to be fragile and have a soft macerated appearance at first solidified (Dunne, 1978). Mummification may occur as a physiological limitation of litter size if litters exceed 10 foetuses and therefore occurs more frequently in older sows that tend to have larger litter than gilts. Diseases particularly parvovirus and leptospirosis can cause it and also deficiencies of riboflavin, vitamin A and iodine. Besides this disadvantageous environmental temperatures, improper management, crashes under transfer or poisoning by insecticides can cause dead of foetuses and subsequent mummification (Dunne, 1978; Kunawongkrit, 1994). The consequence is that less piglets are produced.

The objective of this research is to study the effects of parity, breed and climate on mummification rate in pigs

Materials and methods

During the years 1994-1998 data on reproductive performances of 109 gilts and 351 sows at The Swine Farm of Animal Science Faculty, Chiangmai University, Thailand have been collected and analysed to assess the fertility (litter size : number of alive piglets + stillbirths + mummified fetuses + afterbirth dead piglets) and study the effects of parities (1-9), breeds (100% Duroc, 100% Landrace, 100% Large White, 50% Landrace × Duroc, 50% Large White × Duroc and 50% Large White × Landrace) and climate (temperature and relative humidity) on occurrence of mummification.

Levene test was used to test for homogeneity of variances and one-way ANOVA for analysis of variances. Tukey HSD test and Least Significant Different test were used to compare means (Dunn and Clark, 1974)

Results and discussion

Comparisons of the litter size and mummification amongst parities are presented in Table 1. The average litter size was 11.54 piglets. This is comparable to the litter sizes in commercial farms reported in the commercial quality assessment in the Netherlands during the year 1978 – 1981 (Sookmanee, 1991). There were no significant differences ($P>0.05$) in litter size among parities, however the mummification rate among parities was significantly ($P<0.05$) different. The highest mummification rate of 7.09 % occurred in first parity. It was significantly higher than the rates by sows in parities 2 and 3 (2.72% and 2.77 % respectively) but not significantly different from the rates of 3.23% to 6.17% found by sows in parities 4 to 9. This verifies the physiological limitation in gilts.

Table 1. Comparison of litter size and mummification rates amongst parities

No.parity	No. of gilts and sows	Litter size		% Mummification	
		Mean	SD	Mean	SD
1	109	11.51	1.85	7.09 ^a	8.86
2	97	11.44	1.80	2.72 ^{bc}	5.88
3	102	11.58	1.89	2.77 ^{bc}	5.45
4	77	11.73	2.21	5.36 ^{ac}	6.90
5	35	11.80	1.86	6.17 ^{ac}	8.43
6	16	12.19	3.80	5.08 ^{ac}	9.62
7	15	10.60	1.60	3.23 ^{ac}	4.75
8	3	10.17	1.17	*	*
9	3	10.33	1.53	5.56 ^{ac}	9.62
Total	460	11.54	2.00	4.55	7.29

* Not compared

Means in the same column with different superscripts are significant different ($p<0.05$)

There were no significant difference among litter size and breeds (Table 2). However, the highest prevalence of mummified pigs of 8.77% which was found by 100% Duroc differed significantly ($P<0.05$) from the values found by 100% Landrace (3.90%), 100% LW (4.25%) and 50% LW×L (4.08%) but not from the rate of 50% LW×D (4.74%). It shows that Duroc sows had a high percentage of mummified foetuses both in pure strain sows and 50% crossbred Large White × Duroc. The analysis is contrasted to the diagnosis summary of clinical signs associated with various broad categories of etiologic factors in reproductive problems by Dunne (1978) that reported no genetic effect on mummification. In Thailand 50% crossbred sows are commonly raised for 3-

lines pig production. The differences of mummification rates in 50% LW × D and LW × L amongst parities are shown in Figure 1. There were no significant difference in LW × L but significant difference ($p < 0.05$) in LW × D compared among parities. These results indicate that neither pure Duroc sows nor crossbred Duroc sows are suitable for 3–lines crossbreeding in commercial pig production.

Table 2. Comparison of litter size and mummification rates amongst breeds

Breed	No. of gilts and sows	Litter size		% Mummification	
		Mean	SD	Mean	SD
100% D	28	11.21	1.83	8.77 ^a	9.78
100% L	120	11.60	2.35	3.90 ^{bc}	6.88
100% LW	151	11.30	1.70	4.25 ^{bc}	6.62
L×D	2	11.00	1.41	*	*
LW×D	131	11.93	2.01	4.74 ^{ac}	7.46
LW×L	29	11.10	1.80	4.08 ^{bc}	7.88
Total	461	11.54	2.00	4.54	7.28

* Not compared

(D = Duroc, L = Landrace, LW = Large White)

Means in the same column with different superscripts are significant different ($p < 0.05$)

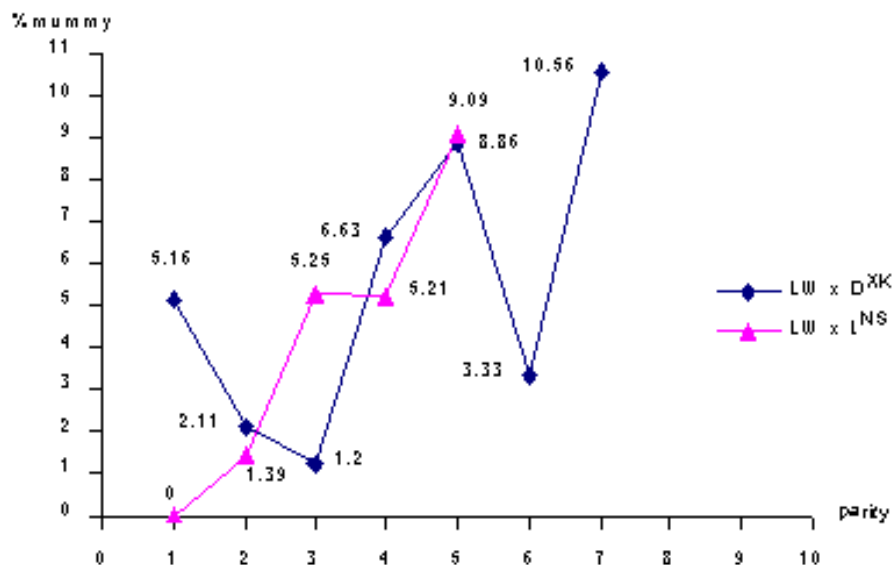


Figure 1. Mummification rates of cross bred LW × D and LW × L classified by parity.

The mean monthly and seasonally mummification rates are illustrated in Table 3. No significant ($P > 0.05$) climatic effect was found among months or seasons but trends of the highest and the lowest mummified percentages were observed in June (5.99%) and February (2.51%) respectively. Seasonally, a trend of higher mummification rates was observed by sows which farrowed during summer (4.96%) and rainy seasons (4.91%) compared to rates of sows which farrowed in the winter season (3.76%). Although no significant differences could be detected, the results are in line with observations of Khanthapanit (1991) who reported that hot and uncomfortable environment in early

gestation age can lead to death of foetuses. As a result, farmers should be aware of climatic variations, particularly in summer.

Table 3. Mummification rates according to farrowing months and seasons during the years 1994-1998.

Farrowing Month	Temperature (°C)		Humidity- (%) avg.	No. of gilts and sows	Mummification Mean±SD	Season (Mean ±SD)
	min-max	avg.				
March	16.8-33.7	27.0	50.0	40	4.42±6.83	Summer 4.96±8.27
April	20.1-34.1	30.0	56.0	43	4.34±7.93	
May	21.6-32.7	28.7	73.5	50	5.09±9.57	
June	22.2-28.4	28.4	78.6	41	5.99±8.39	
July	21.5-27.6	27.6	79.5	44	4.88±7.41	Rainy 4.91±7.09
August	21.2-26.9	26.9	83.0	29	5.58±6.79	
September	20.8-27.4	27.4	80.5	31	4.16±7.16	
October	20.8-26.4	26.4	74.5	28	5.12±7.11	
November	17.1-24.2	24.2	72.5	39	4.09±6.71	Winter 3.76±6.15
December	13.6-22.0	22.0	69.5	29	4.17±6.71	
January	11.3-22.4	22.4	72.2	44	4.42±6.34	
February	13.7-24.0	24.0	54.7	43	2.51±4.96	

p-value = 0.8421

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