

THE IMPACT OF CROSS-FOSTERING ON SWINE PRODUCTION

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Abstract

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Cross-fostering is a technique used in swine management systems to reduce preweaning mortality rates, increase growth rates and reduce weight variations in litters. However, extensive cross-fostering and moving piglets from one litter to another throughout the lactation period, can decrease both weaning weights and growth rates. To avoid these impacts, limited cross-fostering during the first few days of life, usually 1-3 days, should be applied. The weak and small piglets at birth should have special care and enough colostrum intake before cross-fostering is performed.

Keywords : cross-foster, piglets, weaning weight, growth rate.

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ผลกระทบของการฝากเลี้ยงต่อผลผลิตสุกร

เทคนิคการฝากเลี้ยงลูกสุกร เป็นระบบการจัดการฟาร์มที่สามารถช่วยลดอัตราการตาย เพิ่มอัตราการเจริญเติบโตและจัดขนาดลูกสุกรให้มีขนาดใกล้เคียงกันก่อนหย่านม แต่หากลูกสุกรถูกฝากเลี้ยงหลายครั้ง หรือถูกฝากเลี้ยงอย่างต่อเนื่อง ถูกย้ายจากครอกหนึ่งสู่อีกครอกหนึ่งตลอดระยะเวลาการให้นมของแม่สุกร สามารถส่งผลให้ลูกสุกรมีน้ำหนักหย่านมและอัตราการเติบโตลดลง เพื่อลดผลกระทบดังกล่าวควรฝากเลี้ยงลูกสุกรเพียงครั้งเดียว ที่ 1-3 วันหลังจากคลอด และให้การดูแลเป็นพิเศษต่อลูกสุกรที่อ่อนแอหรือสุกรที่มีขนาดเล็ก และลูกสุกรควรได้รับนม น้ำเหลืองจากแม่สุกรอย่างเพียงพอก่อนทำการฝากเลี้ยง

คำสำคัญ : การฝากเลี้ยง, ผลกระทบ, ลูกสุกร, น้ำหนักหย่านม, อัตราการเติบโต

Introduction

Two of the major aims during the suckling period are to reduce preweaning mortality rates and increase piglet bodyweights at weaning. Greater weaning weight allows piglets to grow more predictably during the nursery period. This article focuses on the small piglets with low birth weights. Birthweight is a key factor for piglet survival and growth. It is positively correlated with survival rates and weaning weights. Heavier piglets at birth have higher survival rates and weaning weights at weaning than the smaller ones (Neal and Irvin, 1991). These results are consistent with those reported by Gardner et al (1989) who compared the survival rates of pigs weighing less than 0.8 kg and birthweights of 2 kg or more. They found that the smaller piglets had a 32% survival rate, whereas the larger ones had a 97% survival rate. Piglets with a low birth weight

were unable to compete with their larger siblings in getting enough colostrum and milk. This yielded not only a higher risk of mortality and slow growth before weaning, but also resulted in high mortality and slow growth during the nursery period.

In farms with successful reproductive management, sows produce a large number of live pigs at farrowing. However, if the numbers of piglets do not match the number of available teats, or the sows do not have enough functional teats for the piglets, there might be problems. In addition, too large a litter size can also influence the piglets survival rate. Stewart and Diekman (1989) reported that piglets from smaller litters (6 piglets per sow) had a higher survival rate and reached market weight at 105 kg, earlier than those from larger litters. This research also supports the concept of standardizing the litter size after farrowing.

Cross-fostering is a strategy widely used in swine management to deal with preweaning problems. The purpose of cross-fostering is to increase survival rates and weaning weights. To accomplish these objectives, the first important activity is matching the number of piglets with sow capacity. This requires matching the number of piglets in the litter to fit the number of functional teats. The second important activity is grouping and adjusting the size of piglets in the litter to minimize any variations in birth weight. This requires one to move 15-20% of the lightest and the heaviest piglets from each litter (Straw et al., 1998^b).

Many reports showed that cross-fostering can increase survival rates in piglets (Marcatti, 1986; Neal and Irvin, 1991), especially for the smaller piglets. Marcatti (1986) reported that piglets with birth weights less than 0.8 kg had a mortality rate when cross-fostered of 15.4%, while piglets of a similar birth weight but not cross-fostered, had a mortality rate four times greater, being about 62.5%.

The pattern of cross-fostering, in practice, has had various alternatives for where piglets should move and how they should be placed. Some researchers recommend that the stronger piglets should be fostered to new litters because they can tolerate the new environmental stress better than weaker piglets (Neal and Irvin, 1991), but it depends on farm management and policy. In large scale sow herds, the care of new born piglets is under the judgment of trained caretakers. It is important to educate workers to understand the criteria they should follow when making a decision

on cross-fostering piglets. The format often practiced in farrowing units, is either continuous cross-fostering throughout the lactation period, or limited cross-fostering which would occur only during the first few days of life.

In continuous cross-fostering, piglets are moved throughout the lactation period. Older piglets are moved to the younger litters to equalize weights at weaning. In North America, fostering older piglets is normally practiced. Straw et al. (1997) reported that 98% of farms used cross-fostering techniques and 40% of the fostered piglets were moved after one week of age. The expectation of continuous cross-fostering is to create a uniform body weight within litters by moving piglets and maintaining beneficial effects in term of growth and survival rate but Straw et al (1998^a) contradicted this belief. A positive result from continuous cross-fostering was reported by Cutler et al. (1992), when transferring individuals piglets back to younger and smaller litters. On the other hand, adverse effects from this procedure in growth performance and mortality rate, have been reported in many studies (Straw et al., 1998^a; Robert and Martineau, 2001; Wattanaphansak et al., 2002).

Under the limited cross-fostering style, piglets are moved only at 1 or 2 days of age. The reason is that the first 2 days after birth is the most convenient time to rearrange the litter since, at this time, piglets have not firmly established their teat order. The teat order is set up during the first 2 days and is relatively stable after the first week. It would not be proper to transfer piglets to a litter after 3 days post-farrowing, since the teat order is

established by the original residents and unused glands will have dried up (Straw et al., 1998^b)

Cross-fostering and pig performance

To maximize benefits, piglets weaned per sow per year are an index that is increased by the application of cross-fostering techniques. However, overusing this tool can also lead to a reduction in performance. Straw et al. (1997) demonstrated that excessive cross-fostering decreases growth rate by 20-25% in fostered piglets under a continuous cross-fostering regime. The reduction of litter weight variation was not attractive if it is associated with stunted growth of the piglets. The slow growth not only affected fostered piglets but also affected resident piglets. The growth curve of transferred piglets dramatically decreases when compared with the resident piglets. However, the mortality rates between the limited cross fostered and continuous cross-fostered piglets were 8% and 8.8% respectively and not significantly different.

Current research has shown a negative effect of continuous cross-fostering, as it may create lightweight pigs at weaning. Wattanaphansak et al. (2002) has described that only cross fostered piglets and those less than 1 kg at birth, were the main risks for becoming a lightweight pig at weaning (less than 3 kg). The growth performance is also shown in table 1.

Table1. Comparison of growth performance between non and cross-foster groups. (Wattanaphansak et al., 2002)

Parameter	Non cross-foster	Continuous cross-foster
Number of piglets	565	1018
Light weight at birth (%)	6.1	18.4
Average birth weight (kg)	1.4	1.4
Light weight at weaning (%)	8.9	26.0
Average weaning weight (kg)	4.2	3.7
Weaning age (Days)	16.5	16.6
Average Daily Grain (g)	171.9	148.4

In this study, continuous cross-fostering created a higher number of lightweight piglets, almost 3 times as many, when compared with non cross-fostered litters. Lightweight pigs at weaning experienced higher mortality and slower growth during the nursery period (Larriestra et al., 2002). The cause of lightweight and stunted growth of cross-fostered piglets may be due to aggressive fighting between adopted and resident piglets when accessing teats. As a result, the amount of milk consumed may have been limited (Robert and Martineau, 2001).

The normal behavior of sows and piglets is changed after repeated cross-fostering. Robert and Martineau (2001) found that the sows became more aggressive toward foster pigs, which is shown by the snapping incidence. The sows look restless and often show nervousness which disrupts nursing, by standing up or sitting, before milk letdown. The nursing intervals were also significantly lower in foster sows.

In addition, the behavior of adopted and resident piglets also changed. Cross-fostering altered the teat order system in the litter. Normally, suckling piglets develop their own teat on the first day of life and suckle the same teat until weaning. When piglets establish a stable teat order, competition among siblings is decreased (de Passill? et al., 1988). When cross fostering is undertaken in the herd, fighting between adopted and resident piglets occurs. There is much more fighting and squealing while the sow takes up her milking position as the piglets wish to get the new teats as soon as possible. A high number of body and face lacerations were noticed in foster piglets, which increases the risk of skin disease.

Principles and practice of cross-fostering piglets

These 10 principles were developed by English (1993) for successful cross-fostering:

1. Prepare piglets for fostering: Let the piglets have enough colostrum from their own dam. This is necessary for piglets may have to move to a sow that has farrowed 1-3 days before receiving her new piglets.
2. Foster promptly: After ensuring piglets have got enough colostrum, they should be transferred immediately.
3. Be kind to small and weak piglets: The smaller and weaker populations should be the first group of concern. If the caretaker thinks that the weak piglets should be left with the original sow then move the strong ones. On the other hand, one should only move the small piglets to new litters that have a similar birth weight and a small litter size, when the original sows are not suitable.
4. Assess the rearing capacity of the sow when deciding on fostering: Evaluating the sow capacity means that the sow should have enough functional teats for all piglets when in her nursing position.
5. Even up birthweights within litters by cross-fostering: In larger herds, adjust for piglets birth weight by cross-fostering between the litters and ensuring that the smaller ones go to the docile sow with fairly slender teats of medium length and at the proper height, suitable for feeding the smaller piglets.
6. Use suckling behavior to guide the fostering of older piglets: When sows farrow overnight, piglets may be 8 or more hours old before transfer can take place. Suckling behavior of piglets should be another criterion for fostering. Piglets which can not establish their own teats are the first candidates for fostering. However, if a small piglet in a large litter, has a stable suckling position, it is a good idea to leave them with their siblings.
7. Make arrangements to have a surplus of newborn piglets: In case of excess piglets or agalactic sows, the largest newborn piglets should be fostered to sows which have good milk production and have farrowed about 1 week previously. To make room, the 1 week old litter can be fostered to docile and milky sows (nurse sows) that were weaned at the normal stage. Leave one or two of the smallest of her own piglets for up to 24 hours, to help the new litter get established.
8. Colostrum sharing can be done soon after birth, for piglets in very large litters. For instance if there are 17-18 piglets in a litter and no recipient sows available, it is impossible to let all of the piglets suckle at the same time. The largest 7-9 piglets should be placed in a warm area for 2 hours, to allow the smaller piglets to suckle first.
9. Cater for ill-thriving piglets in older litters: Piglets which are ill-thriving in older litters because of malnutrition, rather than disease can be fostered to newly farrowed sows. It is necessary to ensure that the older piglets are

matched in size and strength with their new littermates.

10. Unused mammary glands take 3 days to dry up: Surplus newborn piglets can be successfully fostered onto sows which have farrowed within 3 days. In this case, the stronger piglets are moved, leaving the smaller ones with their own dam.

In summary, to succeed in cross-fostering, the worker should be trained to apply the best procedures for the herd. Cross-fostering protocols should be monitored and evaluated by using data analysis (Cruz et al., 2000). Transferring piglets is not a good idea in all situations. The plans may well depend on the farm management system and herd health status. The more concern that is shown to the small and weak piglets, the more successful it will be in cross-fostering. Wait until the piglets get adequate colostrum after birth and then move them as soon as possible, preferably only once.

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