

## UPCOMING EVENTS

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## Weaning Weight—Why It's More Important Than You Think

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With the implementation of early weaning in many production systems, the success of nursery feeding programs will be influenced by weaning weight and its variation. Because the nutrient requirements of the young pig change so rapidly, small variations in weaning weight require different management strategies and labor intensity in the nursery. Experience demonstrates that the younger and lighter the pig, the more difficult it is to manage in the nursery. Data also indicates that lighter weight pigs at weaning are at a higher risk of death than heavier pigs.

### Variation in Weaning Weight

We have examined the variation in individual pig weaning weight from several groups of pigs and have found that the standard deviation of individual pig weight is consistently close to 2 pounds. Also, the distribution of pig weights at weaning commonly approximates a normal distribution or the classic bell-shaped curve. Therefore, weight of 68 percent of the pigs will be within one standard deviation of the mean, weight of 28 percent of the pigs will be within one and two standard deviations, while

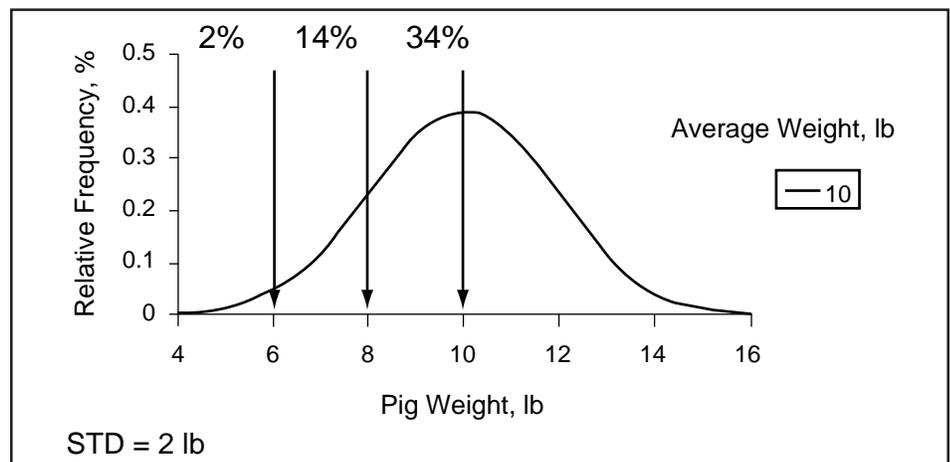
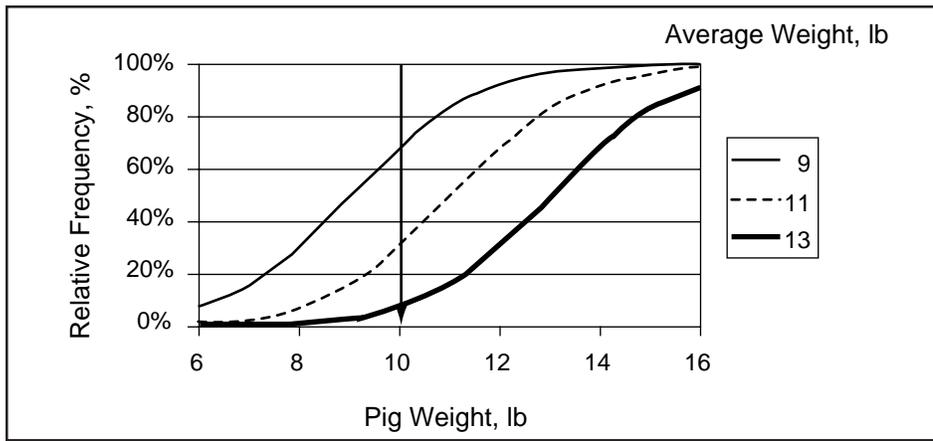


Figure 1. Distribution of Pig Weights at Weaning



**Figure 2. Cumulative Distribution of Pig Weights at Different Weaning Weights**

the remaining 4 percent of the pigs will weigh more than two standard deviations from the mean. A normally distributed population of pigs with an average weaning weight of 10 pounds and standard deviation of 2 pounds is presented in Figure 1. Due to the consistent variation in weaning weight, an approximate proportion of pigs in 2-pound weight increments can be easily calculated. For example, in a group of pigs with an average weaning weight of 10 pounds, approximately 34 percent will weigh between 8 and 10 pounds, 14 percent between 6 and 8 pounds, and 2 percent will weigh less than 6 pound. The proportions are similar for the pigs that weigh more than the mean; 34 percent weigh from 10 to 12 pounds, 14 percent from 12 to 14 pounds, and 2 percent weigh greater than 14 pounds.

The implications of a relatively large deviation in litter weaning weight are illustrated in Figure 2. This graph demonstrates the cumulative distribution of pig weaning weights within a population that has average weaning weights of 13, 11 and 9 pounds. As shown by this graph, the proportion of pigs greater than 10 pounds is approximately 95 percent for the 13-pound average weaning weight, 70 percent for the 11-pound average, and only 30 percent for the 9-pound average. This chart illustrates that just a 2-pound increase in average weaning weight will necessitate a dramatic change in nursery management intensity. This data further illustrates the large influence that lactation feeding has on nursery feeding programs. It emphasizes the need to keep feed available to sows at all times during lactation!

Based on the 2-pound standard deviation of weaning weight we have developed the following tables to assist in determining the number of pigs in each weight category if the average weaning weight is known. Listed in Table 1 is the percentage of pigs within each 1-pound weight group with weaning weights ranging from 8 to 13 pounds. Listed in Table 2 is the cumulative percentage of pigs within each 1-pound weight group, and in Table 3 is the number of pigs (for a 600-head group) within each of the 1-pound weight groups. This data can be adapted to your business' specific weaning conditions and numbers to establish procedures for sorting pigs and developing their nutritional programs.

**Table 1. Percentage of pigs between each weight grouping**

Weight, pound	Average Pig Weaning Weight					
	8	9	10	11	12	13
< 2	0.1%					
2 to 3	0.5%	0.1%				
3 to 4	1.7%	0.5%	0.1%			
4 to 5	4.4%	1.7%	0.5%	0.1%		
5 to 6	9.2%	4.4%	1.7%	0.5%	0.1%	
6 to 7	15.0%	9.2%	4.4%	1.7%	0.5%	0.1%
7 to 8	19.1%	15.0%	9.2%	4.4%	1.7%	0.5%
8 to 9	19.1%	19.1%	15.0%	9.2%	4.4%	1.7%
9 to 10	15.0%	19.1%	19.1%	15.0%	9.2%	4.4%
10 to 11	9.2%	15.0%	19.1%	19.1%	15.0%	9.2%
11 to 12	4.4%	9.2%	15.0%	19.1%	19.1%	15.0%
12 to 13	1.7%	4.4%	9.2%	15.0%	19.1%	19.1%
13 to 14	0.5%	1.7%	4.4%	9.2%	15.0%	19.1%
14 to 15	0.1%	0.5%	1.7%	4.4%	9.2%	15.0%
15 to 16		0.1%	0.5%	1.7%	4.4%	9.2%
16 to 17			0.1%	0.5%	1.7%	4.4%
17 to 18				0.1%	0.5%	1.7%
18 to 19					0.1%	0.5%
> 19						0.1%

## Developing the Feed Budget

If you know your average weaning weights, the tables presented in this report can help establish how many pens will need to be used for penning pigs with different weights. The following guidelines are used for determining the appropriate amount of feed to budget per nursery (Table 4). The SEW diet is budgeted at 1 pound per pig for each pound below 11 pounds and .5 pound per pig if the average nursery weight is above 11 pounds. A minimum amount of this diet is used for pigs heavier than 11 pounds to ensure that they rapidly begin to eat after weaning.

The transition diet budget is based on 5 pounds per pig with 1 pound per pig subtracted for each pound that the average nursery weight is greater than 11 pounds. Phase 2 and 3 are budgeted 15 and 50 pounds, respectively. These guidelines are based on based on recommendations in the 1997 Kansas Swine Nutrition Guide.

We use these guidelines to monitor the total amount of each feed delivered to the nursery. Overfeeding of the first diets after weaning is a common cause of excessive feed cost in the nursery phase. However, based on the relatively wide range of weight distribution in nurseries with pigs that have widely varying nutrient requirements, astute nursery managers modify the amount of SEW and transition diet feed that is fed by pen within a nursery.

**Table 2. Cumulative percentage of pigs at each weight**

Weight, pound	Average Pig Weaning Weight					
	8	9	10.0	11.0	12	13.0
< 2	0.1%	0.0%				
< 3	0.6%	0.1%	0.0%			
< 4	2.3%	0.6%	0.1%	0.0%		
< 5	6.7%	2.3%	0.6%	0.1%	0.0%	
< 6	15.9%	6.7%	2.3%	0.6%	0.1%	0.0%
< 7	30.9%	15.9%	6.7%	2.3%	0.6%	0.1%
< 8	50.0%	30.9%	15.9%	6.7%	2.3%	0.6%
< 9	69.1%	50.0%	30.9%	15.9%	6.7%	2.3%
< 10	84.1%	69.1%	50.0%	30.9%	15.9%	6.7%
< 11	93.3%	84.1%	69.1%	50.0%	30.9%	15.9%
< 12	97.7%	93.3%	84.1%	69.1%	50.0%	30.9%
< 13	99.4%	97.7%	93.3%	84.1%	69.1%	50.0%
< 14	99.9%	99.4%	97.7%	93.3%	84.1%	69.1%
< 15	100.0%	99.9%	99.4%	97.7%	93.3%	84.1%
< 16		100.0%	99.9%	99.4%	97.7%	93.3%
< 17			100.0%	99.9%	99.4%	97.7%
< 18				100.0%	99.9%	99.4%
< 19					100.0%	99.9%
< 20						100.0%

**Table 3. Number of pigs less than each weight in a group of 600 pigs**

Weight, pound	Average Pig Weaning Weight					
	8	9	10	11	12	13
< 6	95	40	14	4	1	—
< 7	185	95	40	14	4	1
< 8	300	185	95	40	14	4
< 9	415	300	185	95	40	14
< 10	505	415	300	185	95	40
< 11	560	505	415	300	185	95
< 12	586	560	505	415	300	185
< 13	596	586	560	505	415	300

**Table 4. Recommended budget amounts of SEW and transition to feed per pig\***

Diet, pound	Average Pig Weaning Weight						
	8	9	10	11	12	13	14
SEW	3	2	1	1	.5	.5	0
Transition	5	5	5	5	4	3	2

\*The recommended budget amounts for phase 2 and 3 are 15 and 50 pounds, respectively for diets without added fat and 13 and 45 pounds, respectively for diets with 5 percent added fat.

**Table 5. Nursery feed budgeting strategy by pen for feeding the SEW and transition diets**

Weight, pound	No Pigs	No Pens	SEW, pound	Transition, pound
Less than 6	25	1	150	150
6 to 8	75	3	150	400
8 to 10	200	8	200	1000
10 to 12	200	8	100	1000
More than 12	100	4	—	300
Total	600	24	600	2850

This table assumes an average weaning weight of 10 pounds.

A nursery feed budgeting strategy for feeding the SEW and transition diet by pen in a 600-head nursery with a 10-pound average initial pig weight is listed in Table 5. We have divided the population of pigs into five weight categories and based on the cumulative weight variation tables and can, thus, determine the number of pens needed for each category. The categories are based on the number of 2-pound increments above and below the average weight. The lightest pigs (less than 4 pounds from the average) will require approximately 2 percent of the pens, the next category (2 to 4 pounds below the average) will require approximately 14 percent of the pens. Each 2-pound category above and below the average requiring 34 percent of the pens with the remaining heaviest pigs in 16 percent of the pens. Based on the weight distributions, specific allowances of the SEW and Transition diets can be allocated to pens based on pig weaning weight.

Many times, the SEW diet will be fed in bagged form or from a small bulk bin and then carted to each feeder. Thus, the SEW diet can be easily fed on an individual pen basis. If the transition diet is fed in bagged form, again feeding by pen is also easily accomplished. However, in larger nurseries, handling large quantities of bagged transition diet is difficult. One strategy for using the transition diet is based on using a combination of bagged and bulk feed. Approximately 90 percent of the transition diet is delivered in the feed tanks and the remaining 10 percent is delivered in bags. When the phase 2 diet is delivered, the remaining 10 percent of bagged feed is then fed to the lightest weight pigs that still weigh less than 15 pounds. These strategies are used to ensure that the lighter weight pigs receive adequate amounts of the feed budget. Small deviations from the proper allocation of SEW and transition diets have large impacts on growth performance. In addition, because the cost of the SEW and Transition diets are usually 4 and 2.5 times more costly than the phase 2 diet, overfeeding these diets rapidly increase feed cost per pig.

In conclusion, by knowing the average weight of your pigs at weaning and its distribution, feed budgets can be customized to minimize over- and underfeeding expensive starter diets. This will result in improved pig growth performance and economical feed costs per pound of gain.

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