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Duane Reese
*University of Nebraska - Lincoln*, dreese1@unl.edu

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# Are The Sows Fed Adequately?

**Duane E. Reese**[1]

**Summary and Implications**

*Feeding and managing sows so changes in their body weight and condition fall within predetermined targets is critical for successful reproduction. General feeding recommendations are useful in designing a feeding strategy for sows in all pork producing operations. However, nutrient requirements are not the same for all sows and there are differences in how well producers implement feeding protocols. It is important sows be monitored systemically on farms to ensure their nutrient requirements are met. Body condition scoring seems to be the most practical and useful method of monitoring sows compared to backfat probing or weighing. Guidelines on how to condition score sows, as well as how to adjust feed intake to achieve a desired body condition score, are provided.*

**Introduction**

The importance of managing sows so they do not gain or lose too much weight or body condition during each parity is well-established. Farrowing difficulties, poor rebreeding performance and high culling rates are frequently due to inadequate control of sow body weight and condition. In addition, the direct economic consequences of under- or overfeeding sows on annual feed costs can be substantial. For example, providing a herd of 500 gestating sows an extra .5 pounds/day of a feed that costs $135/ton will increase annual feed cost by at least $4,000. This estimate does not include the cost to provide the heavier sows with more feed just to meet their maintenance requirement. Because an increasing number of sows are being fed and housed individually, it is possible to feed sows according to individual need.

General sow feeding recommendations are available from universities, veterinarians, private consultants and feed industry representatives. However, because there is variation in animals, environmental conditions and job performance of people, those recommendations may not be directly applicable to some pork production units. Therefore, it is necessary to monitor sows on individual farms to determine the adequacy of the current feeding management practices. There are at least three methods to assess how well sows are being fed: body condition scoring, backfat probing and weighing. In the following paper, the scientific merit and practical significance of these methods will be discussed.

**Research Results**

*Body condition scoring*

Most producers who body condition score visually inspect the sow's body around the region of the backbone and hips and then decide how much feed she needs to achieve a target condition score at farrowing. A few producers will also palpate the sow's hips and ribs to estimate backfat thickness. Body condition scoring is the most popular of the three methods, because no equipment is required and it requires less time. However, condition scoring is very subjective, and can result in misjudging and incorrect feeding.

Studies indicate condition scoring does not reliably estimate the amount of backfat or bodyfat sows have ($r^2$ = .09 to .53). In addition, other studies found no relationship between body condition score and rebreeding performance in sows. As expected, the reproducibility of condition scores (the extent to which independent evaluators agree on the score of sows) is about 15 percent less than when using objective methods such as electronic backfat probing.

*Backfat probing (electronic)*

Usually, researchers and producers determine a sow's backfat by electronically probing the tenth rib area just off the midline. Because an electronic probe provides a more objective evaluation of body condition than condition scoring, it is a valuable tool for teaching people how to condition score. However, backfat probing is more time consuming than body condition scoring and requires an investment in a probe. A few producers are using a backfat probe on sows.

Research results show the amount of backfat a sow has at weaning is not a reliable predictor of rebreeding performance. Although a backfat probe will provide a reliable estimate of a sow's body fat content, most research indicates the amount of body protein is a bigger factor affecting rebreeding performance than body fat level.

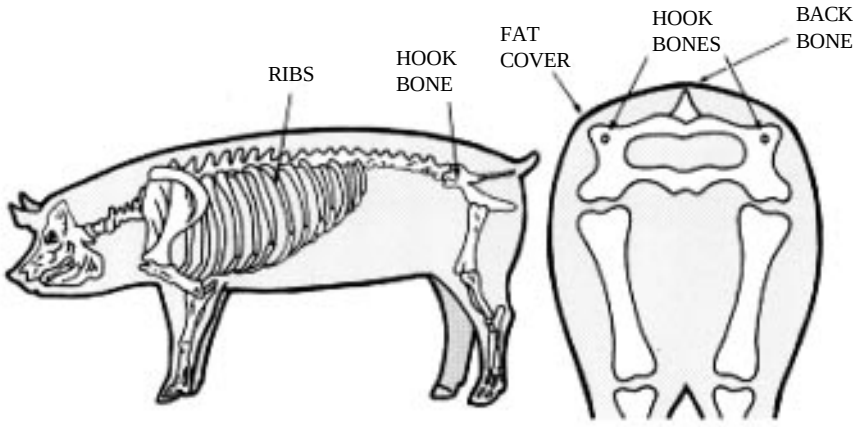
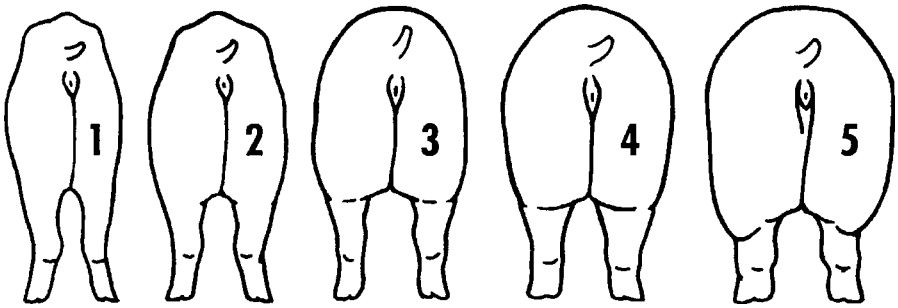



**Figure 1. Location of the ribs, backbone and hook "H" bones of the sows.**




| Score | Condition | Detection of ribs, H-bones and backbone |
|---|---|---|
| 1 | Emaciated | Obvious |
| 2 | Thin | Easily detected with palpation |
| 3 | Ideal | Barely felt with firm palm pressure |
| 4 | Fat | None |
| 5 | Overfat | None |

**Figure 2. Condition scores of sows (adapted from Patience et al., 1995).**

*Weighing*

While weighing provides objective information, it is time consuming, requires an investment in scales and many producers do not have the facilities to weigh sows efficiently. In contrast to backfat probing, weighing accounts for the total tissue mass of the sow's body. However, research indicates body weight and backfat are poorly correlated (r = .20 to .53), indicating some sows get fatter as they gain weight from one parity to the next and others loose backfat but still gain weight.

It is generally accepted that sows in normal condition and housed under reasonable environmental conditions (in confinement at 65°F), should gain between about 75 and 110 pounds during pregnancy (Table 1). If sows are fed to achieve these gains, they should perform adequately.

**Table 1. Suggested target weight gains during successive pregnancies of high-producing sows[a].**

| Parity | Littersize, total | Maternal weight gain, lb | Conceptus weight gain, lb[b] | Total weight gain, lb[c] |
|---|---|---|---|---|
| 1 | 10.0 | 60 | 50 | 110 |
| 2 | 11.0 | 50 | 55 | 105 |
| 3 | 12.0 | 45 | 60 | 105 |
| 4 | 12.0 | 40 | 60 | 100 |
| 5 | 12.0 | 30 | 60 | 90 |
| 6 | 11.0 | 20 | 55 | 75 |

[a]Adapted from Aherne and Williams, 1992 and Verstegen et al., 1987.
[b]Conceptus (placental membranes, fluids, and the fetus) assumed to weigh 5 lb/fetus (NRC 1998).
[c]Maternal + conceptus weight gain.

**Best Method**

All three methods have limitations. When considering the overall value of the results and cost to the producer, however, condition scoring seems to be the best way to access how well sows are fed and managed on individual farms. Although condition scoring is not useful for estimating the amount of backfat on individual sows, it is valuable for assessing the relative degree of conditioning in a group of sows. An evaluator who correctly condition scores evaluates both backfat thickness and lean body mass, both essential tissues for sustained reproduction. Backfat probing by itself is not very useful, but it could be if it were combined with a measure of muscle mass. To increase the usefulness of weighing sows, also estimate backfat, either by palpation or electronic probe.

**How to Condition Score**

For best results with condition scoring, locate the ribs, backbone and hook "H" bones of the sow (Figure 1). Palpate the ribs and the "H" bones to access fat cover. Observe the backbone's prominence and give the sow a score between "1" and "5" (Figure 2). A sow should attain a score of "3" just before farrowing. In general, if it takes more than 3 seconds to feel the ribs or "H" bone on a sow, she is probably a "4" or "5". Obviously, it is much easier to condition score and feed sows according to need if they are housed in individual stalls rather than in pens.

In general, it is best to condition

(Continued on next page)

score each sow three or four times during each gestation in herds with reproductive problems or in herds with no history of recorded condition scoring. Once sow body condition in a herd stabilizes to a desired level or a feeding management protocol is proven satisfactory, a condition score monitoring program is probably sufficient. In a monitoring program only 15 to 20 percent of the sow groups are actually condition scored as described above.

Try combining condition scoring with other activities, such as pregnancy checks and vaccinations, to save time opening gates and positioning people to score sows. Good times to score would be at mating, and at about day 50 and 90 of gestation. Results are more accurate if the scores of two people are averaged. The same "team" should be delegated the responsibility to condition score if possible. It is also important to note the sow's condition score on her information card, otherwise monitoring her progress is impossible. One convenient way to record an individual sow's score would be to include the information shown in Figure 3 on the sow's card and simply check or circle the drawing best representing the score given at evaluation.

The process of body condition scoring described in this paper might seem labor-intensive compared to other methods. The objective of any efforts to determine the adequacy of a sow feeding program should be to collect valid data to use to make sound management decisions. Some operations would make better use of human resources and have more useful data by reducing the number of times sows are "condition scored" and implement the above procedure.

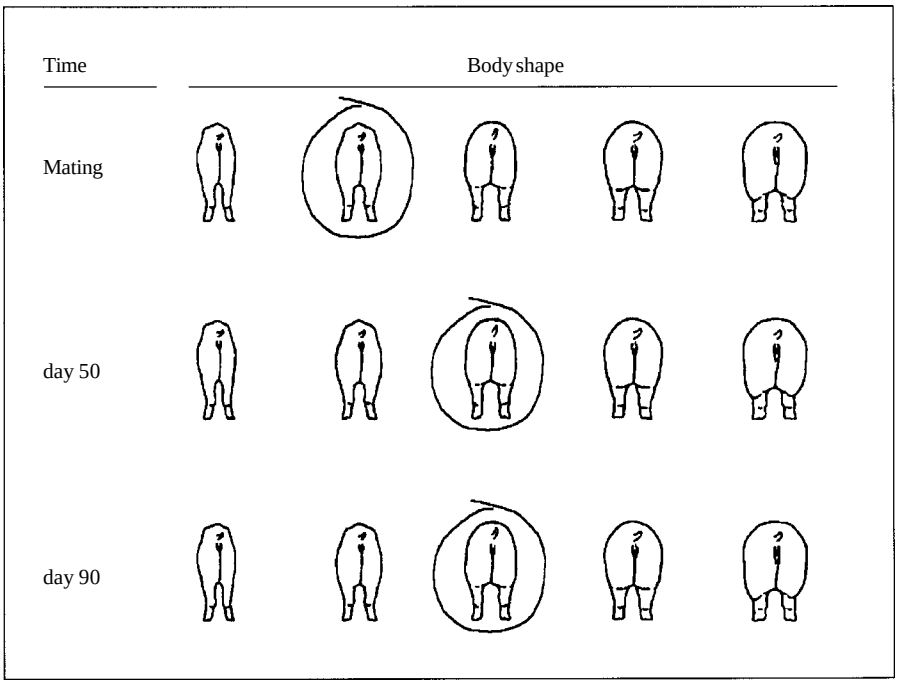



**Figure 3. Example record of condition scores on one sow during gestation.**

### Adjusting the Feed

It is important to define an operation's "base feeding rate" in order to use body condition scoring effectively. A base feeding rate represents that amount of feed which will allow a sow to gain the proper amount of weight and condition during gestation, assuming she is housed in an environmentally regulated facility and has a body condition score of about 2.5 at mating. In most operations, the base feeding rate is 4 to 4.5 pounds per day of a corn or milo-soybean meal diet during gestation.

Some sows loose considerable weight and condition during lactation, resulting in a body condition score less than 2.5 at mating. These sows need to be given more feed than the base amount, because they need to exceed the maternal weight gains shown in Table 1. Other sows may be over-conditioned at mating and should be fed less than the base amount of feed to gain slightly less weight than shown in Table 1.

How should the feed adjustments be determined? According to the 1998 National Research Council's model on the nutrient requirements of swine, maternal weight gain during gestation changes by about 20 pounds for each one-half pound of a corn/soybean meal diet (metabolizable energy = 1,450 kcal/pound) that is given above or below a base amount of feed (4 to 4.5 pounds/day; Table 2). Thus, if a second parity sow needed to gain 70 pounds of maternal weight during gestation instead of 50 pounds (normal weight gain, Table 1), she should be fed the base amount of feed plus 5 pounds of feed/day during gestation (total of 4.5 to 5.0 pounds feed/day).

**Table 2. Effect of .5 pound/day adjustments in sow gestation feed intake relative to a base amount on maternal weight gain change during gestation[a,b].**

| Deviation from base feed amount, lb/d[c] | Maternal weight gain change, lb |
|---|---|
| -.5 | -20 |
| 0 | 0 |
| .5 | 20 |
| 1.0 | 40 |

[a] A 350 to 450 lb sow housed in an environmental regulated facility at 65°F for 115 days.
[b] NRC, 1998.
[c] 4 to 4.5 lb/d of a corn or milo-soybean meal diet.

Ideally, sows needing more or less feed than the base amount would be identified at mating. The advantage of identifying the sows early in gestation is that small adjustments in the feeding rate (.5 to 1.0 pounds/day) are necessary to impact maternal weight gain. In addition, if a sow is not on target to reach a desired weight gain or

**Table 3. Estimated adjustments in the amount of feed from a base amount to provide gestating sows in relation to number of days available to condition the sow.**

| No. days available to condition sow | Maternal weight gain change[a] | | |
|---|---|---|---|
| | -20 | 20 | 40 |
| | ---------- lb feed/d from base amount[b] ---------- | | |
| 115 | -.5 | .5 | 1.0 |
| 85 | -.7 | .7 | 1.4 |
| 55 | -.7[c] | 1.1 | 2.1 |
| 25 | -.7[c] | 2.3 | 4.6 |
| Total feed adjustment, lb/sow | -57.5 | 57.5 | 115.0 |

[a]Relative to suggested maternal weight gains in Table 1.
[b]4 to 4.5 lb/d of a corn or milo-soybean meal diet.
[c]Although a greater reduction in sow feed intake would be necessary to reduce maternal weight gain by 20 lb during gestation, it is not recommended that feed intake be reduced further, because fetal development and future sow performance may be impaired.

body condition at farrowing, there is still time to impact her weight gain through further adjustments in her feeding rate.

However, preliminary research indicates increasing the amount of feed given to the sow between days 25 and 50 of gestation may benefit muscle development in the fetus which may improve performance during the growing/finishing period. If this is true, it may be best to condition a sow between days 25 and 50 of gestation.

Table 3 shows how much feed is required per day to alter maternal weight gain, depending on the number of days available to condition the sow. For example, if a sow is allowed 115 days to gain 20 pounds more maternal weight than normal, she should be fed 5 pounds/day more feed than the base amount. However, if she has only 55 days to gain 20 extra pounds of maternal weight, she requires 1.1 pounds of feed above base amount per day during that time.

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[1]Duane E. Reese is an Extension swine specialist and associate professor in the Department of Animal Science. References available from the author upon request.