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DETERMINING FEED BUDGETS FOR FARM-SPECIFIC NUTRITIONAL PROGRAMS

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Summary

Use of feed budgets simplifies feed delivery and improves the accuracy of delivering diets to the correct pig weight ranges during the nursery and finishing periods. Little information has been available for determining farm-specific feed budgets in the past. In this paper, we will outline simple methods to customize a feed budget for individual farms using feed efficiency from past closeout records.

Procedures

Several steps must be considered when developing farm-specific feed budgets. The first step is determining whether the budget must be changed with season. If feed efficiency is seasonal, the amount of feed to be fed during each particular phase of the growing period must be changed. The data in Figure 1 indicate the seasonality of average daily gain and average daily feed intake. These data were derived from a study at the University of Minnesota. The data include 528 batches of pigs with approximately 10 closeouts for each week of the year. These data were converted into a ratio relative to the mean to determine an adjustment factor for gain, feed intake, and feed efficiency (Figure 2). Feed intake varies 5% above and below the mean. The variation for gain is also about 5%; however, the seasonal patterns for gain and intake are quite similar. Thus, the seasonal adjustment for feed efficiency is relatively small (1 to 2%) and of little importance in assigning feed budgets.

Because the seasonal impact on feed efficiency is small, the same feed budget can be used throughout the year. To establish the feed budget, we must know the amount of feed used to reach each weight break and determine the quantity to feed during each stage by difference in the end points. Using the results of several trials, we have developed a standard feed usage curve to use in the finishing period. This curve can be expressed with the following equation:

$$\text{Total feed used} = 0.00463 \times \text{weight}^2 + 1.68 \times \text{weight} - 22.05.$$

This curve has a base feed efficiency of 3.069 from 50 to 250 lb. This curve can be scaled up or down to the level of feed efficiency measured in a particular production system. In order to adjust the curve to a particular system, the feed efficiency from 50 to 250 lb must be determined. Because past closeouts rarely begin and end at exactly 50 and 250 lb, respectively, the following equation can be used to determine the adjusted feed efficiency:

$$\text{Adjusted feed efficiency} =$$
$$\text{Actual F/G} - ((\text{Initial wt-50}) \times 0.006) + ((250 - \text{final wt}) \times 0.006).$$

The total feed used by each weight is divided by 3.09 and multiplied by the adjusted feed efficiency to determine the amount of feed used for the adjusted feed efficiency. To simplify these calculations, we provide Table 1 with total feed used calculated for several adjusted feed efficiencies.

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These numbers can be used to determine individual feed budgets for any weight breaks. An example is provided in Table 2. We also have developed a spreadsheet to easily calculate the budget and help with feed deliveries. The spreadsheet is in Microsoft Excel format and can be obtained from Mike Tokach at 785-532-2032.

Two problems can occur with this approach. First, we assume that all farms have similar shapes for feed efficiency curves. Although this assumption is too simplistic, the error that it causes does not prevent us from developing relatively accurate feed budgets. The second problem is that this approach does not consider wide varia-tions in energy content or change in diet form from one phase to the next; for example, if pelleted diets or high energy diets are used in one phase and not in another. The relative feed efficiency during the phase with the pelleted or high energy diets would be lower than calculated. Conversely, the feed efficiency will be higher than calculated in the other stages. If the various growing-finishing stages do not have similar energy levels, the feed budget may need to be adjusted accordingly.

How to improve on the feed budget? We recommend using these methods to determine an initial feed budget. Then you can test weigh pigs when diets are changed to determine if they have reached or exceeded the target finishing weight for each stage and adjust the budget accordingly.

**Table 1.   Cumulative Feed Usage (lb/pig) during the Finishing Period**

Pig Weight, lb	Adjusted Feed Efficiency[a]					
	2.4	2.6	2.8	3.0	3.2	3.4
50	0	0	0	0	0	0
60	17	19	20	21	23	24
70	35	38	41	44	47	50
80	54	58	62	67	71	76
90	73	79	85	91	97	103
100	93	101	108	116	124	132
110	114	123	133	142	151	161
120	135	146	158	169	180	191
130	157	170	183	197	210	223
140	180	195	210	225	240	255
150	204	221	238	255	272	289
160	228	247	266	285	304	323
170	253	274	295	317	338	359
180	279	302	326	349	372	395
190	306	331	357	382	407	433
200	333	361	388	416	444	472
210	361	391	421	451	481	511
220	390	422	454	487	519	552
230	419	454	489	524	559	594
240	449	487	524	561	599	636
250	480	520	560	600	640	680
260	512	554	597	640	682	725
270	544	589	635	680	725	771
280	577	625	673	721	769	817
290	611	662	713	763	814	865
300	645	699	753	807	860	914

[a]Adjusted feed efficiency is adjusted to the period from 50 to 250 lb using the following equation: Adjusted F/G = Actual F/G -((Initial wt-50)×0.006)+((250-final wt)×0.006).

Table 2.   Example Feed Budgets (lb/pig) Based on Adjusted Feed Efficiency

| Pig Weight, lb | Adjusted Feed Efficiency[a] | | | | | |
	2.4	2.6	2.8	3.0	3.2	3.4
50 to 80	54	58	62	67	71	76
80 to 120	81	88	96	102	109	115
120 to 160	93	101	108	116	124	132
160 to 200	105	114	122	131	140	149
200 to 250	147	159	172	184	196	208

[a]Adjusted feed efficiency is adjusted to the period from 50 to 250 lb using the following equation: Adjusted F/G = Actual F/G -((Initial wt-50)×0.006)+((250-final wt)×0.006).
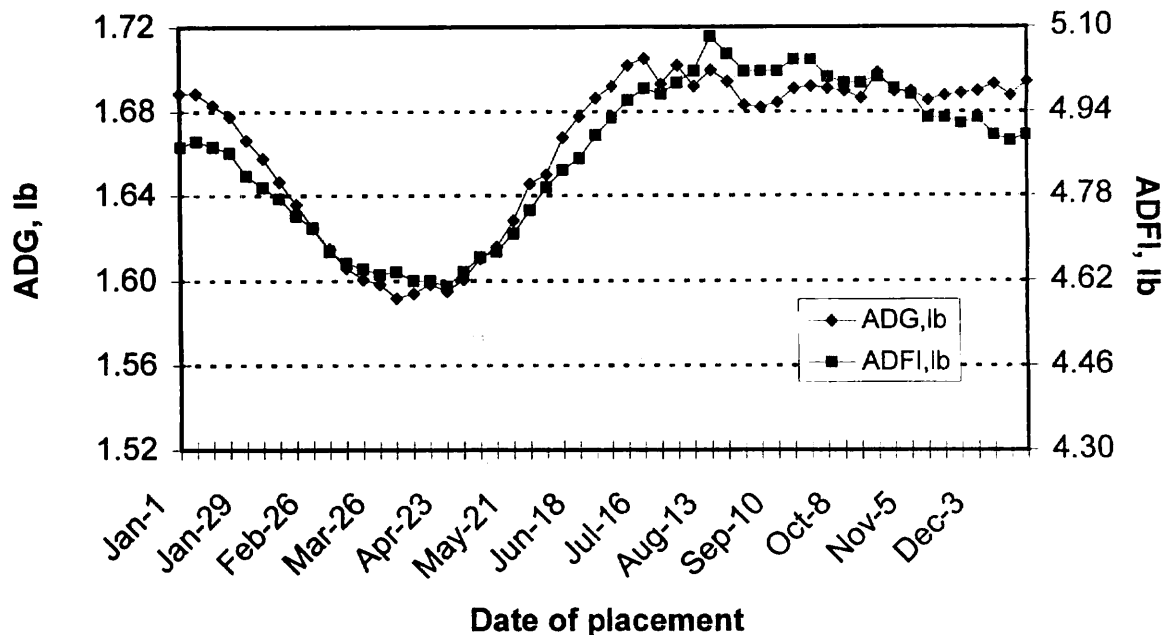
Figure 1. Influence of Season on Average Daily Gain and Feed Intake
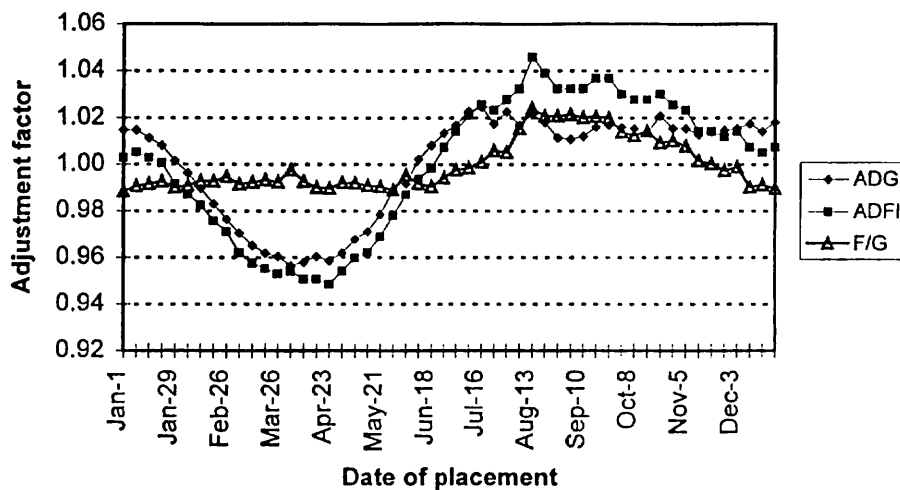
Figure 2.   Adjustment Factors for the Influence of Season on Growing-Finishing Performance

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