Adjusting and Monitoring Meat Animal Growth Rate

Adjusting growth rate of meat animals (market pigs, lambs, cattle, and goats) is a useful skill for livestock caretakers of all ages.

Adjusting growth rate requires baseline knowledge of normal growth, feed usage, and knowing the nutrient profile of your animal's diet. Note that, if you are not feeding a complete diet, for age and species, these growth rates will not compare to your animal's growth rate. Let's look at some benchmarks:

1. **Expected growth rate**, and days to market and reach desirable market weights. This can be referred to as **Average Daily Gain (ADG)**, as this is the expected amount of weight gained per day.

<table>
<thead>
<tr>
<th>Species</th>
<th>Typical, Average Daily Gain</th>
<th>Weight at Purchase, lbs.</th>
<th>Expected Days to Market (Market Weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pigs</td>
<td>1.7 lbs./day (range 1.2-2.5)</td>
<td>60</td>
<td>118 days (260 lbs.)</td>
</tr>
<tr>
<td>Lambs</td>
<td>0.5 lbs./day</td>
<td>50</td>
<td>140 (120 lbs)</td>
</tr>
<tr>
<td>Goats</td>
<td>.25-.33 lbs./day</td>
<td>40</td>
<td>120 (75 lbs)</td>
</tr>
<tr>
<td>Cattle</td>
<td>2.0 (range 1.5-4.5)</td>
<td>500</td>
<td>400 (1300 lbs)</td>
</tr>
</tbody>
</table>

To calculate Average Daily Gain (ADG): Total weight gain / Number of days between start weight and Current Weight

To calculate days to Market: Total gain to reach market weight / ADG

2. **Expected feed consumption**, of a complete, age & species appropriate diet. This can be referred to as **Feed Conversion Rate (FCR)**, as this is the expected amount of feed needed for your animal to gain 1 lb. of weight, per day.

<table>
<thead>
<tr>
<th>Species</th>
<th>Typical, Average Feed to Gain 1 lb. weight* (F/G)</th>
<th>Weight at Purchase, lbs. (market weight)</th>
<th>Total estimated feed to reach market weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pigs</td>
<td>3 lbs.</td>
<td>60 (260)</td>
<td>600</td>
</tr>
<tr>
<td>Lambs</td>
<td>5 lbs.</td>
<td>50 (120)</td>
<td>350</td>
</tr>
<tr>
<td>Goats</td>
<td>7 lbs.</td>
<td>40 (76)</td>
<td>252</td>
</tr>
<tr>
<td>Cattle</td>
<td>5.5 lbs.</td>
<td>500 (1300)</td>
<td>4400</td>
</tr>
</tbody>
</table>

To calculate Feed Conversion Rate (FCR) = Total weight gained / Total feed consumed

To determine total estimated feed usage to reach market weight = Total gain to reach market weight x FCR

Remember, the table data assume that livestock are receiving a complete feed, appropriate for species and age of your animal. These numbers can vary depending on gender and genetics. Additional resources on feed stuffs, calculating ADG, and growth rate can be found in materials you might already have, like The Ohio State University Extension Market Hog books, or Penn State Extension resources for Market Lambs and Kids. Remember that your 4H leaders can help you find more materials to for understanding your animal’s growth.

There are 3 core principles to adjusting growth rate:

1. **Feeding method** (self-feeding vs limit feeding). Animals fed a complete, nutrient-dense diet will grow faster if fed on a self-feeder than if they are fed a limited amount of feed several times per day. Self-fed animals and those fed 3 or more times per day eat more total feed and are expected to grow faster than animals fed less than 2 times per day. Limit-fed animals are very efficient and may grow faster than expected.

2. **Gender selection**. In all meat animal species (pigs, cattle, sheep, goats), castrated males (barrows, steers, wethers) generally eat more feed and grow faster than females (heifers, ewes, doelings).

3. **Dietary nutrient density** (high energy vs low energy). Diets with increased fiber will slow growth rate in all animals. Common PA fiber sources include oats, wheat.
middles, beet pulp, alfalfa meal, chopped straw, and soy hulls. For ruminants (beef, sheep, and goats), increasing the amount of hay offered will also increase dietary fiber and slow growth rate. Be sure to keep at least 15% of a ruminant’s diet as forage (hay) to ensure rumen function.

Monitoring your animal’s growth rate:
Routine weights should only be collected every 2 weeks, getting weights more often will lead to more work for less accurate data. Smaller, goats, lambs, and pigs may be weighed on a set of bathroom scales by subtracting the weight of the person holding the animal from the combined weight of the person and animal weighed together. If you don’t have access to a set of large enough scales, you can monitor animal growth rate using body measurements. Follow the materials provided by University of Arizona Extension: “How Much Does Your Animal Weigh?”

After you estimate your animal’s weight, utilize your record keeping skills. Keeping good records of dates, weights, and how much feed your animal used. Here is an example of how your pig growth records might look:

<table>
<thead>
<tr>
<th>Date Weighed</th>
<th>Weight</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 1, 2020</td>
<td>100 lbs.</td>
<td>Pig eating well, feeder empty, added a bag of feed (50 lbs.)</td>
</tr>
<tr>
<td>May 15, 2020</td>
<td>120 lbs.</td>
<td>Pig eating well, feeder empty on May 12, put in new bag of feed (50 lbs.)</td>
</tr>
</tbody>
</table>

Now, because our example has all the notes we need, we can use our formulas from above to figure out how our animal grew and how much feed it ate during that time.

First, let's find total weight gain: 120 - 100 = 20 lbs. gained. How many days did it take for the pig to gain this weight? 15-1 = 14 days. To find ADG, we divide total gain (20 lbs.) by the number of days (14) = 1.43 lbs. gained, per day.

Our pig needs a market weight of 260 lbs. If our pig keeps gaining at this rate, it take 98 days to reach market weight. We know this because our pig will first need to gain 140 lbs. (260 lbs. market weight - 120 lbs. current weight). And if we divide that weight by our ADG (140 lbs. / 1.43), we get 98 days to market. If today is May 15, the pig will be ready for market on Aug 21.

But what if your pig doesn't go to slaughter until Sept 21? That is 30 days past the Aug 21 date of your growth rate. This would be 128 days to slaughter, instead of 98 days that your pig will take on the current feeding program. You need to slow down your pig's growth rate. Good thing you have been keeping records on feed usage, and you are feeding a complete diet. This is exactly the information you need to slow your pig down.

Your notes say your pig used 50 lbs. of feed (from a self feeder) in 12 days. We know this because you had an empty feeder when you put a new, 50 lb. bag of feed into it. Then, 12 days later, the feeder was empty again. That means your pig used all 50 lbs. of feed in 12 days. So, how much feed did your pig eat each day? 50 lbs. / 12 days = 4.17 lbs. of feed used by your pig, each day.

Now, let's find out how much feed your pig eating, per pound of weight gain using our FCR formula: 4.17 / 1.43 = 2.9 lbs. of feed per 1 lbs. of weight gain. How much feed will this take to reach your target market weight? 140 x 2.9 = 406 lbs. of feed needed to reach market weight on Aug 21. To slow our pig's growth rate for the slaughter date on Sept 21, we need to slow down our pig's growth rate, which means reducing complete feed usage each day. In this scenario, we will add some fiber to the diet, and takeaway some of the feed the pig is eating. Let's reduce your pig's total feed consumption by dividing the total feed consumption (406 lbs.) by our new slaughter date timeline (128 days) 406 / 128 = 3.17 lbs. of complete feed per day. To reach 4.17 lbs. of feed per day, add 1 lb. of fiber to your pig’s diet by mixing chopped straw, adding soybean hulls, or other high-fiber, low energy feed-stuffs to your pig's feed.

For all animals, apply feed changes gradually. A 1 lb. reduction in complete diet is a big reduction, and your pig will change its growth over time. Best practice is to evaluate your animal's growth and feed usage every 2 weeks, be sure to calculate weight gain and feed used with the formulas provided. Reducing usage of complete feed will impact your animal's growth, and it is important to monitor that growth routinely to be sure you are meeting your goals, and keeping your animal healthy. Always reach out to experts and consult the best option for manipulating diets for animals in your care.

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