

Technical Bulletin #09:

How to Feed Fish

Using a Feeding Table

Why worry about how fish are fed?

The goal of fish farming is to economically raise healthy, high-quality fish. What the fish eats and how much it eats are very important. Between 40 and 50 percent of the cost of producing fish is due to the cost of feed. The more efficiently feed is used, the more profitable the farm will be, the faster the fish will grow, and the healthier the fish will be. Over-feeding fish will result in loss of profits and degraded water quality, while underfeeding fish will result in poor growth and health.

How is the daily ration of feed for my fish calculated?

The easiest way to calculate a daily ration for fish is to use a feeding table. Feeding tables are a good guide to determine how much to feed fish, but must be used with care. A feeding table estimates the amount of feed required based on the species of fish and their size. An example of a feeding table is provided in this bulletin. Take a moment to look at the feeding table before continuing. The remainder of this bulletin explains how to use a feeding table.

(Column One of Feeding Table) Why is the size of the fish being fed important?

With these tables the fish are fed based on a percentage of their body weight. Small fish are growing at an amazingly fast rate. Because they are growing so fast they must be fed a higher percentage of their body weight each day. As a fish grows the rate of growth slows. Because of this, as a fish grows we reduce the amount of food they are given. However, remember that because the fish are growing larger the total weight of feed offered to the fish will constantly increase over the growing cycle even as the percent of their body weight being fed decreases.

(Column Two of Feeding Table) What does percent body weight mean?

The percent body weight of fish is the weight of feed to be fed as a proportion of the total weight of fish in the pond. For example, if there are 100 kilograms of fish in a pond that are being fed 5 percent of their body weight every day, this would equal 5 kilograms of feed. To calculate the correct amount of feed, follow this formula:

$$\text{Daily Feed Rate} = \frac{(\text{Total Weight of Fish}) \times (\% \text{ Bodyweight from table})}{100}$$

Again, notice that in the table as the size of the fish increases, the percentage of their body weight they are being fed decreases. Regular monthly samples are necessary in order to monitor average fish size (see technical bulletin: "How to Sample a Fish Pond").

The daily feed ration should be calculated every week and carefully weighed each day. This is one of the reasons that good record keeping is necessary for anyone growing fish (see technical bulletin: "Aquaculture Record Keeping").





(Column Three of Feeding Table) How often should fish be feed?

Fast growing young fish cannot eat all the food they need to grow in one big meal. Their stomachs just are not big enough. Because of this, small fish should be fed many small meals throughout the day. Feeding a small fish its daily feed in one big meal will result in most of the feed sinking to the bottom uneaten. The result will be fish that are not getting enough food, and expensive food rotting on the bottom of the pond. Look at the feeding table and notice that small fish should have their daily ration divided into at least four equal portions. As fish get larger, they grow slower and have larger stomachs so the number of feedings each day decreases. Notice though that even large fish should have their daily ration divided into two portions.

(Column Four of Feeding Table) Why do fish need protein in order to grow?

Fish flesh is mostly muscle. It is important to remember that fish do not have to keep their bodies warm. This means that when a fish feeds it needs lots of protein to make muscle, and does not need as much of the high energy provided by starches and sugars as other farm animals do. Because of this, fish diets usually need to be very high in protein and low in fats and energy. A few fish, such as Tilapia, can digest lower-quality feeds that are higher in starch and fiber.

As the amount of protein in feed is increased, the cost of the feed per kilogram also usually increases. This is offset to some degree by the fact that fish require less protein in their feed as they grow larger. Small fish require higher amounts of protein in their diets than large fish. Use the feeding table to determine how much protein needs to be in the diet of various sizes and species of fish.

(Column Five of Feeding Table) Why is food size important?

A small fish has a small mouth, and a large fish has a larger mouth. If you give a small fish a feed that is nutritionally correct but is too large to fit in its mouth, the food will not be efficiently eaten. Much of it will sink to the bottom of the pond uneaten. If you give a large fish good food that is too small, again it will not be eaten efficiently. Providing the correct size of feed is important. Use the feeding table to determine the best size of feed to use for a particular size of fish.

How is the weight of the fish in the pond calculated?

A pond can be sampled using a cast net to determine the average weight of fish in the pond (see Technical Bulletin: "How to Sample a Fish Pond" for details). If good records are kept, it will be possible to estimate the number of fish in the pond (see Technical Bulletin: "Aquaculture Record Keeping"). Using these two important pieces of information and the formula below, it is possible to get a good estimate of the weight of fish in a pond.

$$\text{Total Weight of Fish} = (\text{Avg. weight of each fish}) \times (\text{Est. Number of fish in pond})$$

If fish do not finish their feed, what should be done?

It is important to carefully watch the fish as they are being fed. If fish are not finishing their feed, the solution is simple! Do not feed them what they are not eating. Reduce the amount of feed to a level that they can consume completely in about 15-20 minutes. Uneaten feed is wasted, sinks to the bottom, and can contribute to bad water quality. Over-feeding increases costs and decreases water quality, both of which will result in reduced profits.

Can fish be fed too much?

The short answer is yes. There is a limit to how much feed can be added to a pond before the water is seriously polluted. The amount of feed given should never exceed 20 grams per square meter per day. This would mean that a 100 square meter pond should never receive more than 2 kilograms of feed per day. Poor water quality, due to excess feed, stresses fish to such an extent that their growth rate and the rate that they convert feed to flesh can be seriously affected negatively.



Mono-sex Tilapia Feeding Table*

Avg. Weight of Each Fish	% Body Weight to Feed	Number Feedings per Day	% Protein Feed	Pellet Size
5g	5.3%	4	35	Powder 
25 g	4.4%	3	35	2mm 
100 g	3.2%	2	30	3mm 
200 g	1.7%	2	30	4mm 
300 g and above	1.5%	2	24-30	5mm 

**This table is only one example. Ask your technician for the most current feeding table for the species of fish you are growing.*

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