FOOD

LIVE FOODS

Crustaceans

Brine Shrimp (Artemia salina)
Brine shrimp is one of the most popular live foods in the hobby. Most brine shrimp available come from San Francisco or the Great Salt Lake. Brine shrimp are available in live, frozen, and freeze-died forms. Brine shrimp eggs are widely available for home cultivation. The young nauplii are excellent food for fry. Adult brine shrimp are suitable for small to large fish. Brine shrimp provide good roughage with their exoskeletons and do not harbor disease to affect freshwater species.

Water Fleas (Daphnia)
Daphnia are an excellent supplementary food that can be fed every 7-10 days to provide roughage. Daphnia are available in frozen, freeze-dried, and occasionally, live forms.

Cyclops
Cyclops are a good food for large fry and small fish. These crustaceans will attack small fry. Cyclops are available in frozen and live forms.

River Shrimps (Gammarus)
These shrimps are a natural food for many large fish, especially cichlids. In order to be kept alive, keep these shrimp in cool water with strong aeration.

Worms

Black Worms
Blackworms are segmented worms typically raised on fish farms (hence significantly cleaner than Tubifex worms).

Tubifex Worms
Tubifex inhabit muddy, polluted streams and cannot be recommended as fish food because they harbor parasites and toxins, and have a low beneficial nutrient content. Always soak the worms in water for several days before feeding. Feed sparingly as uneaten Tubifex worms will burrow in the gravel and may die. Tubifex worms are only good to feed temporarily, if fish refuse all other foods.

White Worms (Enchytraea)
White worms are found in decomposing materials including compost piles and seaweed piles. White worms are fatty and should only be fed on an occasionally basis. White worms are commonly used to feed older fry. These worms can be cultured at home.

Earthworms
Earthworms can be found in most gardens. Before feeding them, clean off all dirt and slime. Earthworms are a good food for large, carnivorous fish.

Insect Larvae

Bloodworms (Chironomus)

A favorite fish food that can be purchased frozen, freeze-dried, or live. In nature blood worms are known for constructing cocoons of plant debris and mud. Chironomus mosquitoes do not bite.

Black Mosquito Larvae

Black Mosquito larvae are an excellent food, full of vitamins that appear to help trigger spawning in some species. Mosquito larvae are easily caught in ponds and can be raised in standing containers of water. Beware that black mosquito sting.

White Mosquito Larvae, Glassworms

Glassworms are found in ponds. These insect larvae develop into gnats. Glassworms are available in live and frozen forms.

Meal Worms

Meal worms are the larvae in beetles and are available in many pet shops. Meal worms can be fed to large fish. These larva should not be considered a regular food, but an occasional supplement.

Insects

Fruit Flies (Drosophila)

Use only short-winged, non-flying fruit flies which are less likely to escape. Drosophila are a natural food for many species and can be used to help stimulate spawning. Drosophila cultures are available mail ordered from breeders. In order to culture Drosophila, place a feeding mush in a jar with two or three dozen fruit flies. The mush can be prepared by blending a banana, one can of plums, corn or oat flakes, one peach or orange, and a cup of vinegar. The mush should be sprinkled with bakerÕs yeast.

Flies, Crickets, Beetles, Back swimmers

House flies can be captured, disabled, and fed to medium to large, carnivorous fish. Crickets can be captured or purchased at a pet store. Beetles and back swimmers can also be captured.

Mollusks

Snails

Small water snails, common stowaways on water plants, can be fed to several species including Pufferfish.

Vertebrates

Feeder Fish, Frogs, Tadpoles

Goldfish and guppies are widely used as feeder fish for large, carnivorous species. Feeder fish can carry disease or parasites. Many aquariasts medicate the water which houses the feeder fish to reduce the risk of the spread of

disease into the main tank. Frogs and tadpoles are used on occasion as foods for large fish. Usually these creatures are captured in local ponds and streams.

FROZEN FOODS

There are many frozen foods available for freshwater fish. Among these include: all of the live foods mentioned previously, krill, plankton, squid, vegetable-based foods, and other meat-based products. There are frozen foods containing a mixture of ingredients formulated specially for certain fish types. Some aquariasts make homemade frozen foods with meats, live foods, and vegetables.

FREEZE-DRIED FOODS

Many varieties of freeze-dried foods are available. Freeze-dried foods have an advantage because they retain all the nutrients of live food but with out the hassle of keeping live foods. However do not feed exclusively freeze-dried foods as, like live foods, they lack vitamins that can be provided by a good flake food.

FLAKE, TABLET, & PELLETED FOODS

Flake, tablet, and pelleted foods are the most widely used food for aquarium fish for good reasons: they are generally inexpensive, easy to use, and well-balanced. These foods are available in many forms including specially formulated mixtures for certain fish or conditions.
Flakes can be fed one to four times a day, but only in small amounts which can be consumed by the fish in two minutes or less (Algae pellets are an exception). Flakes absorb water within 10 seconds of being added to the water. With fish that feed on the flakes before they absorb water, the flakes should be soaked before adding them to the tank.

MICRO FOODS

Micro foods are easier to collect or culture than they are to buy. Micro foods are usually used for raising small fry.

Green Water (Suspended Algae)

Green water is easily cultured. Simply take a jar of aquarium or aged tap water and leave it in a sunny spot. Add some algae from the aquarium and add a few drops of plant fertilizer. The suspended algae should develop within a few days. Dispense the Ògreen waterÓ using an eye dropper.

Infusoria and Rotifers

Infusoria is the name given to certain single-celled microorganisms. Infusoria are often present in the aquarium. Infusoria can be cultured by adding crushed

banana or lettuce to a jar filled with aquarium water. Within a few days, the presence of infusoria can be determined by the cloudy water. Feed the infusoria using an eyedropper. Rotifer eggs can often be purchased at pet shops.

Other Protists

Other protists can be collected, with care, from ponds and other sources of clean water. Pass the water through fine mesh in order to collect the small organisms. Beware that some microorganisms may harm fry.

Egg Yolk

Egg yolk can be prepared for feeding by shaking yolk in a jar until the water is cloudy. Then dispense the yolk using an eyedropper.

VACATION FEEDING Do not add any new plants or fish to the tank later than one month before the vacation. Prior to taking a vacation, the tank should be given a thorough water change and no new fish or plants should be added. If the aquariast is to be gone less than a week, the fish need not be fed unless young fish or fry are kept. If the aquariast is gone for longer than a week or does not feel comfortable not feeding their fish, then an automatic feeder can be purchased. But a well-known brand that will not likely breakdown during the vacation. Be sure to test the feeder for a least a week prior to vacationing and remember not to allow the feeder distribute too much food. An alternative is to have a friend or neighbor feed the fish and look after the tank. Leave previously measured daily feeding portions and a check list of things (Water temperature, filters, dead fish, etc.) for the friend to look after. A less popular alternative is to leave the fish at a reliable aquarium store with feeding instructions. Usually the fee for this service is not too high.

FEEDING HABITATS

Fish are usually divided into four eating groups: carnivores, herbivores, omnivores, and limnivores.

Carnivores are meat-eating fish which are usually predatory by nature. In the wild, these species feed on fish, insects, insect larvae, and crustaceans. Large carnivores may only eat a few times a week. Carnivores have a large stomach and a short digestive tract. In the aquarium, depending on the size of the carnivore, the fish can be fed live foods and flakes.

Herbivores are vegetable, plant, fruit, and algae feeders by nature. Herbivores are frequent feeders and have a long digestive system. In the aquarium, herbivores can be fed flakes, vegetables, and plant matter.

Omnivores feed on a variety of foods in nature. In the aquarium, omnivores can be given live, flake, and vegetable foods.

Limnivores, also known as mud-eaters, feed on algae and detritus (and the microorganisms that inhabit them), and rasp on wood. Limnivores are constantly feeding and have a small stomach with a long digestive tract. In aquaria, limnivores can be fed pellets and algae.

FOOD COMPOSITION

Depending on the fishÕs feeding habits (carnivore, omnivore, herbivore, limnivore), the percentage of fat, fiber, and protein varies.

	Carnivore	Omnivore	Herbivore	Limnivore
Fat	**3-6%**	**2-5%**	**1-3%**	**2-4%**
Fiber	**2-4%**	**3-8%**	**2-6%**	**5-10%**
Protein	**45-70%**	**30-40%**	**30-40%**	**15-30%**
Moisture	**6-10%**	**6-10%**	**6-10%**	**6-10%**

VITAMINS

Vitamin A
effect: cell growth
symptoms of deficiency: poor growth, deformation of vertebral column and fins
source: liver, spinach, carrots

Vitamin B1 (thiamin)
effect: breakdown of carbohydrates, promotes growth and fertility
symptoms of deficiency: frightened behavior, poor growth, decline in appetite.
source: paprika, peas, carrots, spinach

Vitamin B2 (riboflavin)
effect: control of enzymes and proteins
symptoms of deficiency: cloudy eyes, poor growth, loss of appetite
source: spinach, peas, paprika, carrots

Vitamin B3 (Nicotin acid)
effect: food breakdown of proteins
symptoms of deficiency: weakness, aimless movements, tumors
source: peas, liver, spinach, paprika

Vitamin B5 (Pantothene acid)
effect: hormone production, metabolism
symptoms of deficiency: weakness, sticking gill membranes
source: liver, paprika

Vitamin B6 (Pyridomin) and B12 (Cyanocobalamin)
effect: enzymes, protein metabolism
symptoms of deficiency: increased panting, loss of appetite, timidness, poor growth
source: liver, paprika

Vitamin C (Ascorbic acid)
effect: bone and tooth development, healing, digestion
symptoms of deficiency: altered skin, liver, and muscle tissue
source: paprika, peas, spinach

Vitamin D3
effect: bone development
symptoms of deficiency: degeneration of bone
source: fish liver, fish meal

Vitamin E
effect: development of sex organs, fertility

symptoms of deficiency: infertility
source: eggs, cereal

Vitamin K
effect: blood formation, blood clotting
symptoms of deficiency: death follow injuries (abrasions)
source: lettuce, peas, spinach

Vitamin M (folic acid)
effect: blood formation, metabolism
symptoms of deficiency: dark skin pigmentation
source:

Choline
effect: growth, fat production, coloration
symptoms of deficiency: enlarged kidney and liver
source: paprika