AQUAGUIDE

MISSOURI DEPARTMENT OF CONSERVATION

Frog Farming Fact or Fiction?

Introduction

The commercial production of frogs to meet the demand for frog legs in the United States is, at best, a chancy undertaking! For a variety of reasons, you should look long and hard before investing your hard-earned cash in any frog farming "get-rich" scheme promising money for an early retirement or supplemental income. Successful frog farming is definitely more a myth than a reality.

Successful frog farming is dependent on a number of variables. Included are land costs, labor costs, feed costs (if any), fencing and lighting costs, cannibalism, disease, climate (growing season), and predation. Most "successful" frog farms turn out to be naturally marshy areas or ponds which have abundant aquatic vegetation for tadpoles and dense grassy cover on the periphery for adult breeding frogs. Production is invariably low because of the limiting variables listed above, often only slightly greater than that found in natural environments.

Individuals selling "breeding pairs" of bullfrogs to unsuspecting potential frog farmers have undoubtedly cornered the market on the only profitable aspect of "commercial" frog production! That doesn't mean you can't have fun specializing in producing

frog legs for your, and your friends', table. This publication will provide you with the latest word on bullfrog biology and ways to create a great-tasting hobby for your enjoyment. Just don't expect to get rich while you're having fun.

The Bullfrog

The common bullfrog (*Rana catesbeiana*) can be found from southern Canada to the Gulf of Mexico and from the Atlantic to the Pacific coast. It is the frog species which grows to the largest size in the United States. Adults frequently reach 8-inches from the nose to the end of their backbone. Legged-tadpoles can reach lengths of 6 to 7 inches from their nose to end of tail. Because of this growth potential, it is the species most commonly selected for culture by individuals getting into the business.

In Missouri, bullfrogs typically breed and deposit their eggs from late April to early July. Typically, a male frog will mate once per season. This means that, if you're starting out, you should strive to have a one-to-one ratio of males to females. Male bullfrogs have a bright yellow throat and the female's throat is a dirty white, mottled with brown. The ear disk of the male is much larger than the eye. The female, however, has an ear disk which is about the same size as the eye.

Bullfrog egg masses float on the surface of the water and frequently cover an area of five square feet. Typically, a female lays from 10,000 to 25,000 eggs, and 20,000 is fairly common. Eggs hatch in 1 – 3 weeks, depending on the water temperature. The resulting tadpoles (larval frogs) spend most of their time grazing on algae and aquatic plants. Since frogs and their tadpoles are cold-blooded animals, they have a slow growth rate. Their actual growth rate is directly dependent on the length of the growing season and the amount of food that is available. In temperate climates like Missouri's, it may take a year, or longer, for tadpoles to transform into young frogs. Growing a frog to marketable size frequently takes another two years, or three years total from egg to harvest.

Adult frogs spend most of their time on land near the edge of the pond looking for suitable food. They commonly eat terrestrial and aquatic insects, small fish, crayfish, small turtles, and tadpoles and young frogs. Bullfrogs eat only moving prey. Despite many efforts, no one has ever found it possible to train them to eat prepared diets. Each mature bullfrog may command as much as 20 feet of shoreline as his or her exclusive hunting preserve. This means that your pond had best have plenty of shoreline! Harvesting techniques for bullfrogs in a "farm" environment are identical to harvesting techniques used to take wild frogs. Common techniques are pole and line angling, hand-netting, spearing or gigging, or grabbing by hand. All are labor intensive.

Commercial Feasibility

Despite many attempts, commercial production of bullfrogs remains a myth. Among the factors frog farmers must face is the poor ratio of food conversion into bullfrog flesh. It takes about 1.15 pounds of live food to produce a 0.4 pound bullfrog with marketable legs.

Currently, frog legs find their way to the consumer's table through international seafood marketing channels. Major suppliers include Bangladesh, Belgium, China, Indonesia, Japan, Mexico, and Taiwan. Most of the frogs entering this market are harvested from the wild. In recent years, imported frog legs have totaled between 1.1 million and 3.3 million pounds. The wholesale value of these wild frog imports has ranged from $2.70 to $3.20 per pound. In the southeastern United States, attempts at commercial frog production have been limited by land and labor costs, technical requirements, short growing season, slow growth rates, predation, cannibalism, and unsolved disease and nutritional problems. Best estimates of production costs for this area are as high as $12.70 per pound. It doesn't take much of a mathematician to rapidly reach the conclusion that attempting to commercially raise bullfrogs has the potential to be a short-cut to the poor house!

Laws and Regulations

Harvesting bullfrogs from your pond for your personal use and enjoyment is allowed. Current harvest limits for wild frogs allow you to take eight frogs a day, and possess up to 16 frogs in the aggregate. Commercialization, or selling your take, is not permitted under rules and regulations of Missouri's *Wildlife Code*. If your pond is fenced from sources of wild frogs, and if you can produce a bill of sale from a licensed source for your breeding stock, you may harvest and possess as many frogs per day as you wish if you have purchased a Class I Wildlife Breeder's Permit. In fact, if you are lucky enough to have a surplus, you may

The Pond

You don't need much of a pond to raise bullfrogs. In fact, many of the characteristics that make a pond good for fish production are wrong for frog production. To start, your "pond" doesn't need to be more than three to four feet deep. Bullfrogs and tadpoles over-winter in the mud at the bottom of the pond. All you need is sufficient water depth to assure that the pond doesn't freeze solid! Most of the pond can be 2- to 12-inches deep.

Your pond should have as much shoreline as possible. Remember, adult bullfrogs need up to 20 feet of shoreline as their hunting preserve. High densities of frogs most commonly lead to disease problems and cannibalism. The best ponds have dense grass growth on their banks.

If you intend to specialize in frog production, your pond should be free of fish that might prey on eggs, tadpoles, and small frogs. It should be equipped with either a solid five-foot high fence, or a tight-mesh wire fence topped by a strand of electrified fence. This will eliminate terrestrial predators such as raccoons, snakes, snapping turtles, and foxes. It won't do anything for avian predators, however. If you hope to exclude frog-eating water and shore birds, you must cover your enclosure with appropriate material.

Your pond must have an abundant supply of unpolluted water. You won't care if it has a healthy growth of algae and aquatic plants since they serve as food for tadpoles and cover for frogs. But, you will want to avoid die-offs of plants which can lead to periods of oxygen depletion. Tadpoles extract their oxygen from water via gills, like fish, and can be killed-off if your pond experiences large swings in oxygen levels.

Artificial Feeding

As mentioned previously, bullfrogs eat only live or moving prey. They do not take artificial diets. You, however, can try several approaches to increase their contacts with insects suitable as food. The simplest method is to surround your pond with artificial lighting. Insects attracted to the lights will spend their days in the grass around the pond and be available as a food source. Another method is to place decaying meat around your pond. This will attract insects which serve as a food source for the frogs. A slightly more sophisticated method involves placing the meat in screens staked twelve or more inches above the ground. Both methods involving meat have the potential to be somewhat odiferous and offensive.

Diseases

Frogs held at high densities are vulnerable to a number of common bacterial infections. Most are highly contagious and fatal. The most common infections are those caused by the common soil and water bacteria *Areomonas spp*. Of these, *Areomonas hydrophila* causes "red leg" which is the congestion and hemorrhaging of the blood vessels on the ventral or under-side of the frog. The frog becomes swollen due to absorption of water without compensatory release by the kidneys. The disease in the wild is invariably fatal.

Fungus infections are also a problem. One, *Saprolegnia spp.*, causes felt-like blotches on the frog's skin, especially in crowded conditions. This disease is highly contagious and usually fatal since there is no known cure.

In Conclusion

Frog farming in Missouri is an economic long-shot. Climate, land and labor costs, and the nature of bullfrog biology and behavior make commercialism for the frog leg market a near economic impossibility! With a little common sense, however, you can have fun with frogs and possibly even provide frog legs for yourself, and your friends and family. Be sure to consult your local Conservation Agent to assure that your operation is in compliance with Missouri's *Wildlife Code*. Good luck!

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DEP
revised **FMR/RLN 3/04**
FIS - 005