School of Agriculture, Fisheries & Human Sciences

COOPERATIVE EXTENSION PROGRAM
University of Arkansas at Pine Bluff

Arkansas Aquafarming

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Hatchery and Brood Fish Management

Larry Dorman, Extension Fisheries Specialist

Many strides have been made in the catfish industry during the last several decades. The industry has progressed from the days of collecting brood fish from local streams and rivers, placing those fish in brood ponds or pens and allowing the fish to spawn, to the recent development of selected lines of fish with improved growth and disease resistance.

Even with the genetic improvements in brood stock, spawning success is often quite low. On average, only 50 percent of females actually spawn. Additionally, survival from the egg to fingerling stages, estimated at 60 percent to 70 percent, could use some improvement.

In some instances, poor spawning and survival is attributed to natural causes or causes beyond the fish culturists′ control. In other cases, poor brood performance and lack of fry survival are caused by errors made by the fish culturist, such as poor timing for certain activities or poor cultural practices. Improvements in facility design and operation may improve spawning success and survival.

This article reviews spawning, hatchery and culture practices used on farms and makes suggestions for improvements.

Evaluate Your Brood Fish — The first step to improvement begins with evaluating your brood fish. The hatchery manager should evaluate brood fish performance and make goals for improvement. Records of performance are important. How did the brood fish perform the previous season? Several numbers are needed - the total number and weight of brood fish, the weight and number of female brood fish and the number of spawns attained. Also needed is an estimate of the number of eggs per spawn.

Evaluate these numbers and determine the number of eggs produced per pound of female brood fish. If the number is less than 2,500 eggs per pound of female brood fish, look for a new line of brood fish. A good line of brood fish produces more than 3,000 eggs per pound of female.

Consider fry and fingerling performance. At reasonable stocking rates, ranging from 100,000 to 200,000 fry per acre, how fast do the fingerlings grow? Are the fingerlings still three inches or less in length in November? or larger? Replace a slow growing strain. Also, note the number of females that actually spawn. If this number has been less than 40 percent the past two years, then replacement brood stock are needed.

Keep careful track of the age of brood fish. Three to four year old fish in the 3 pound to 6 pound size range usually perform well. They produce large numbers of eggs in relationship to body weight, and a high percentage of females spawn. Also, fish of 3 to 6 pounds are in an ideal size range for the spawning receptacles made from old ammunition propellant cans, which are used on most farms. Fish larger than 8 pounds will not spawn in these containers because they cannot fit comfortably inside them.

Examine and cull brood fish each year. Late fall through mid-winter is a good time for this activity. Fish handled too near the start of spawning season may be stressed and may not successfully spawn, so don′ t delay.

Brood fish are seined and crowded and individually examined. Select fish with good traits — body shape, size and robustness. Discard fish with any deformity or undesirable trait. Set sex ratios at this time and stock fish in fresh brood ponds at 3 to 1 female to male or 3 to 2 female to male. Brood fish should never exceed 1,200 pounds per acre.

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Upcoming Events

Arkansas Aquaculture 2003
Jan. 30 - Feb 1, 2003
Annual educational meetings, jointly sponsored by the Catfish Farmers of Arkansas and the Arkansas Bait and Ornamental Fish Growers Association. Austin Hotel, Hot Springs, Arkansas. For registration information contact Van Pennington at 501-328-5195 or Ronnie Anderson at 870-552-7506.

Fish Farming Trade Show
Feb. 6-7, 2003
The largest fish farming equipment exposition in the United States. The tenth Fish Farming Trade Show will be held at the Washington County Convention Center in Greenville, Mississippi. The event is sponsored by the Catfish Farmers of Arkansas as well as Catfish Farmers of Mississippi, Alabama Catfish Producers and Louisiana Catfish Farmers Association. Before February 3 registration is $10. Mail pre-registration to The Fish Farming Trade Show, 1100 Highway 82 East, Suite 202, Indianola, MS 38751. The cost will be $20 for those who pay at the door. For more information call 601-714-5327.

Aquaculture America 2003
Feb. 18-21, 2003
(Trade Show, Feb 19-21)
This annual gathering of U.S. producers and researchers will take place at the Kentucky International Convention Center, Louisville, Kentucky. See http://www.aquacultureamerica.org/Louisville/Pages/Louisville2003.html for more information or call 760-432-4270.

Catfish Farmers of America Annual Convention
Feb. 20-22, 2003
The Catfish Farmers of America Annual Convention will be held February 20-22 at the Hilton Sandestin Resort in Destin, Florida. The event will include presentation on industry topics, the annual awards luncheon and business meeting. The contact number is 662-887-2699.

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Feed brood fish a 36 percent crude protein pellet at 2 percent body weight daily when water temperature is above 70º F. When water temperature is between 55º F and 70º F, feed fish 1 percent body weight three days per week. When water temperature is below 55º F, don′ t feed.

Locating Improved Brood Fish Lines — Many private hatcheries have developed excellent lines of brood fish by selecting fish with the most desirable traits and especially improved growth rate. These hatcheries are the most readily available source of brood fish for the industry at present. These brood fish are of known age and are reasonably priced.

A genetically improved line of catfish, the USDA/NWAW 103 strain, has been available to catfish producers for the past three years. Some private companies also offer genetically improved lines. These are excellent brood fish. They offer faster growth and improved disease resistance. They generally spawn at three years of age and produce very high numbers of eggs relative to body weight. Because individual egg size is smaller than standard farm strains of catfish, the number of eggs per spawn is higher.

Price is a major drawback to the genetically improved fish; however, with the current industry downturn, the 103 fingerlings are not bringing a premium price. Another drawback is that the brood fish may be sold at a size too small to spawn so they must be grown a year before serving as reliable brooders.

Furthermore, farm facilities are evaluated before releasing improved strains to farms. Researchers who developed these lines require as much isolation of these fish as possible to maintain genetic integrity. Not all farms that want these fish qualify to receive them.

Practices to Avoid — Know the age of fish you purchase. The largest fish from a food fish farm are not always the best brood. Fish from food fish farms may be large simply because they have successfully avoided being seined in past years, and nobody wants fish which are wise enough to avoid the seine or with slow growth.

Some farms place brood containers in food fish ponds and collect eggs. This is common when fingerlings are in very short supply, but it is not a good strategy because fry are not selected for optimum traits.

Hatchery Considerations — Hatcheries vary considerably in design, from elaborate facilities with specialized equipment to low cost portable tanks placed in the corner of a farm shop. Regardless of design, water quality and quantity is the major consideration. Hatching tanks require a minimum of 2 to 5 gallons per minute. Most hatcheries with newer wells meet this requirement. Beware of slow water flow from corroded screens on older wells.

Check water flow at hatcheries during winter. Open valves or spigots into each trough and use a stopwatch as you catch water in a graduated container. If water flow is less than 2 gallons per minute, improvements are needed. Some situations require an alternate water source, or replacement of well screens or other parts. Some producers pour concentrated hydrochloric acid into wellheads to dissolve minerals on the screen so the water flow can return to full capacity.

Other water quality considerations are listed in Table 1 (page 3).

Special Problems — Water temperature is another important consideration. Many hatcheries use groundwater from shallow aquifers. Water from this particular aquifer is usually in the mid-60's. Ideal temperatures for hatching range from 78 - 80º F. For every two degrees above or below 78º F, add or subtract a day from the hatching time. If the water temperature is below 75º F, then the spawns are susceptible to fungal infections. If the water temperature is above 85º F, the spawns are susceptible to bacterial infections, and the fry may have genetic deformities. Table 2 (page 3), gives the stages of channel catfish egg development at 78º F.

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Table 1. Desirable water quality values associated with hatching channel catfish eggs.

Parameter Measured	Desirable Range
Dissolved oxygen	5 ppm to saturation
Carbon dioxide	less than 15 ppm
Total alkalinity	50 to 400 ppm
Total hardness	50 to 400 ppm
Calcium hardness	10 to 160 ppm
pH	6.5 to 9.0
Iron	less than 0.5 ppm
Hydrogen sulfide	0.000 ppm
Temperature	75 F minimum

Table 2. Stages of channel catfish egg development at 78^{O} F.

Distinctive feature	Age (days)
No internal pulsation (heart beat)	1
Pulsation visible	2
Bloody streaks visible	3
Entire egg bloody in appearance	4
Eyes visible	5
Eyes prominent, embryo turns in shell	6
Embryo complete, no bloody streaks	7
Hatching begins	8

Another problem encountered on heating water is gas supersaturation, particularly problems with nitrogen gas. Fry develop gas bubbles beneath the skin and in severe situations massive mortalities can occur. To remedy this situation, the water must be aerated before being heated. Aeration strips the gas from the water and prevents the problem. Pump water from the well into a vat or trough with several air stones running, and then pump it into the water heater.

High iron can also be a problem in water from the shallow aquifer. Iron filtration is needed if 1to 6 ppm are reported. Iron filtration involves aerating the water and letting the iron settle out in a holding vat. Pump the water through a series of filters to remove the remaining iron. These filtration systems may be as simple as a series of swimming pool filters linked together to very complex type systems with automatic backwash settings. Once the iron is removed, the water is ready to be heated and pumped into the hatchery.

This article is not intended to solve all problems that a fish culturist may encounter but to stimulate thought, through solving problems.

EPA's Proposed Rule for Aquaculture Effluent Limitations Guidelines

Carole R. Engle
Director, Aquaculture/Fisheries Center

The proposed rule for aquaculture under the Effluent Limitations guideline program was published in the Federal Register on September 12, 2002. The comment period on this notice has been extended through January 27, 2003. It is to the advantage of the aquaculture industry for fish farmers to send in comments on this proposed rule. It is very important to understand that this is only a *proposal* and that it could change.

The proposal currently excludes ponds and says that "for many aquatic animals raised in ponds, the pond itself serves as a natural biological treatment system to reduce wastes generated by animals in the pond." However, EPA is inviting comments on its proposal not to adopt rules for ponds. For example, if you agree with the proposed rule to exclude ponds, it is important to send positive comments to EPA to support this ruling. The proposal includes rules for flow-through, net pen, and recirculating systems for facilities that produce at least 100,000 lb/yr.

For more information on how to submit written comments to EPA, contact one of the UAPB Extension aquaculture specialists.

Arkansas Game and Fish Commission Ends Private Pond Stocking Program

Effective January 31, 2003, the Arkansas Game and Fish Commission will stop taking applications for fish from private farm pond applicants. The UAPB Aquaculture/Fisheries Center is developing a list of private fish producers who will sell to farm pond owners. The list will also be posted on the Internet. Forms have been mailed to known sport fish producers.

If you are interested in being included on the list but have not been contacted, call or fax Nathan Stone at the Aquaculture/Fisheries Center (phone: 870-543-8138, fax: 870-543-8162) as soon as possible, and a form will be faxed or mailed to you.

Recent Seafood Market Trends in the United States

Carole R. Engle
Director, Aquaculture/Fisheries Center

The U.S. aquaculture industry is facing economic difficulties. Much has been written on the causes of the current economic situation. Since aquaculture products compete in the overall seafood market, a review of some recent seafood market trends is useful.

Sales of a number of aquaculture products, including catfish, trout and tilapia in the U.S. decreased in 2001 from the previous year's levels. Salmon production was an exception and increased in 2001. However, the increased salmon production was accompanied by a drop in prices of 20 percent to 33 percent, depending on fish size. Catfish farm prices also dropped by 13 percent in 2001, and frozen catfish fillet prices fell 11 percent. Shrimp prices dropped by 13 percent to 39 percent in 2001. Trout prices were an exception; they increased somewhat, but these higher prices were accompanied by a 5 percent decrease in production.

Were aquaculture products alone in experiencing declining prices in 2001? No. Of the 14 finfish and shellfish commodities highlighted in the 2002 Annual Report of the United States Seafood Industry, nine exhibited declining prices and two had stable prices in 2001. No price data were available for two of the three remaining categories. Of all seafood commodities, comprising capture and aquaculture, only trout showed higher prices in 2001, accompanied by decreasing sales volume, however.

Unlike seafood prices, food prices in general in the U.S., as measured by the Consumer Price Index for all foods, increased by 3.2 percent in 2001. Average prices rose by 8.4 percent, poultry by 3.2 percent, but consumer seafood prices rose by only 0.4 percent. The food service sector accounted for 51.7 percent of wholesale seafood sales.

In 2001 consumer seafood purchases were marginally higher than the previous year with both the food service and retail grocery sectors showing increased sales from those in 2000. Per capita seafood consumption decreased by 0.4 lb in 2001, to 14.8 lb/capita. Per capita consumption of seafood likely decreased due to declines in canned tuna consumption. Consumption of canned tuna in delicatessens (a major outlet for canned tuna) fell sharply after September 11. Overall, per capita seafood consumption hit a peak in 1987 and then fell to a level that has averaged about 15 lb/capita throughout the 1990s. Consumers appear to be substituting chicken more than seafood for red meat.

Of the 14.8 lb/capita of seafood consumed, 69 percent was fresh and frozen, 20 percent was canned tuna, 3 percent canned salmon, 6 percent other canned, and 2 percent cured. Of the 69 percent that was fresh or frozen, 3.4 lb/capita was fillets and steaks, 3.4 lb/capita was shrimp, 2.7 lb/capita was other, and 0.8 lb/capita was sticks and portions. Of these, fillets and steaks and shrimp increased proportionately over those in 2000.

Does declining per capita consumption simply mean that seafood supplies cannot keep pace with population growth? Or, are there other factors involved? Are seafood and aquaculture producers not convincing Americans to eat more seafood in spite of the health benefits? Why is this the case? Is it the quality? Unfamiliarity with preparing seafood? Price? Or simply consumer habits?

The Consumer Expenditure Survey, conducted by the U.S. Bureau of Labor Statistics, in 2000 reported that the average U.S. household spent $110/yr on seafood for at-home use compared to $34/yr for eggs, $145/yr on poultry, $167/yr on pork and $238/yr on beef. Consumers in the northeast region spent the most, followed by consumers in the west, south and midwest. Consumers aged 45-54 spent the most followed by consumers aged 35-44 and then 25-34. African-American consumers and Hispanics spent more at-home on seafood than Caucasian/Asians.

At the retail level, the lower shrimp and salmon prices allowed retailers to have higher margins (>50 percent instead of the more typical margins of 30 percent to 35 percent) while offering lower prices to consumers than in the previous year. The low shrimp and salmon prices enabled retailers to hold sales stable after September 11 through the end of 2001.

Frozen seafood sales are among the fastest growing areas of frozen foods in grocery stores. Of these, name brand frozen seafoods had sales increases of 17.4 percent from August 2001 to August 2002. Other research shows that less than 25 percent of grocery store shoppers use full service seafood departments on a regular basis. This same research shows that a good frozen food department is more important to consumers when they choose a grocery store than a good fresh seafood department.

Food service sales, on the other hand, fell in 2001, but they were projected to increase by 3.9 percent in 2002. Full-service and fast casual restaurant sales were expected to continue to show increases in 2002.

Overall, the seafood sector continues to consolidate, with fewer processing and wholesaling plants and lower employment in 2001 than in 2000. Moreover, broadline distributors have also become more consolidated over time with increased buying power.

Aquaculture producers and processors need creative and resourceful plans to navigate the enigmatic U.S. seafood market. US consumers constitute the second largest seafood imports market in the world, but they are not eating more per capita in spite of the recognized health benefits of seafood.

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We need more research and understanding of why, when, how much, and where U.S. consumers purchase seafood to better understand why U.S. consumers are not eating more seafood. Is it packaging? Is it related to seafood safety? Should aquaculture products be marketed more distinctly from other seafood? Is it simply lack of experience preparing seafood? How can we sell more catfish? Is there potential to position catfish products differently in the market, with different pricing strategies? If so, which ones, how, where, when? What new markets can be created or developed for catfish?

Comprehensive market research can provide the basic understanding of consumers and buyers that will be necessary to fashion effective advertising campaigns and to develop effective market positioning strategies.

Increasing demand for aquaculture products will have a positive effect on prices of aquaculture products. Until new technologies emerge that lower production costs, market research and intensified marketing efforts will be necessary for U.S. aquaculture growers to compete effectively.

Much of the information in this article was summarized from the 2002 Annual Report on the United States Seafood Industry by H.M. Johnson, which can be ordered from www.hmj.com.

Aquatic Nuisance Species and Arkansas Bait and Ornamental Fish Growers

Nathan Stone, Extension Fisheries Specialist

Sea Grant specialists in Minnesota and Michigan have developed an excellent HACCP manual (Gunderson and Kinnunen 2001) to help northern state baitfish harvesters (and farmers) make sure their bait is not contaminated with exotic animals or plants.

HACCP stands for "Hazard Analysis and Critical Control Point." It's a plan to identify hazards (in this case, aquatic nuisance species commonly known by the acronym "ANS") and exactly where in the production process each hazard can best be controlled.

Accidental introduction of non-indigenous (non-native) species is an issue traditionally linked to baitfish harvesting. Wild-caught baitfish can consist of a mix of species, and unless great care is taken to sort out unwanted species, bait bucket releases of these fish can cause ecological damage. The presence of new, exotic organisms in areas where baitfish are harvested further increases the associated risks.

The Great Lakes area has suffered from a host of exotic invaders, many linked to introductions via ballast water discharges from commercial shipping. The list includes a range of different types of organisms, including zebra mussels, spiny and fishhook waterfleas, rusty crayfish, ruffe, round gobies, hydrilla, water chestnut and Eurasian milfoil. All of these species could be harvested along with wild baitfish and accidentally distributed to new areas. The HACCP manual was compiled to help reduce those risks.

The rudd and Asian carps (bighead, grass, silver and black) are also listed in the manual as aquatic nuisance species. This becomes an issue of importance to our baitfish producers because these fish species have been cultured in Arkansas. Scientists at the UAPB Aquaculture/Fisheries Center have followed procedures outlined in the Sea Grant HACCP manual and conducted hazard analysis to evaluate the level of risk of accidental transport of ANS through baitfish operations.

Rudd were first brought to this country in the late 1800s or early 1900s, introduced again in the late 1960s or early 1970s and have been reported in 20 states (Fuller et al. 1999). At one time, fish farming operations in Arkansas and Oklahoma were a source of introductions (Burkhead and Williams 1991). Over a decade ago, the Arkansas Game and Fish Commission (Code of Regulations 32.16) prohibited the release of rudd or their sale to vendors and anglers within the state. With other states prohibiting rudd and no markets within the state, commercial rudd culture ended. So the rudd is not a current concern as an aquatic nuisance hazard on baitfish farms.

Recent publicity over the possibility that bighead carp in the Mississippi River might reach the Great Lakes has fueled a new wave of calls for action to restrict Asian carps. Reproduction of the Asian carps, production of triploids and rearing of fry to fingerlings is a specialized and technical business that only a few fish farms engage in. Following the HACCP manual guidelines, these fish species are not an ANS hazard on Arkansas baitfish farms. Most farms do not have these species present, or if present (e.g., grass carp for weed control in a fathead minnow pond), they are large fish that could not be accidentally harvested or mistaken as baitfish. Baitfish are dipped by hand from harvest nets and taken to a holding shed where fish are graded using aluminum bar panels with relatively narrow bar spacings. For fathead minnows, commonly a 15/64–inch grader is used first (Stone et al. 1997).

So, the accidental transport of aquatic nuisance species with loads of farm-raised baitfish is not an issue. It is essential, however, for farmers to be vigilant and proactive, and to make

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sure that their farms remain free from any species or fish sizes that could be accidentally mixed in with baitfish. If hazardous ANS species were ever to become established in or around Arkansas baitfish farms, the Sea Grant HACCP manual provides a model for preventing their spread.

There will be more "scare" stories about exotic fish species in the media. As has been pointed out many times, there are good reasons for concern over exotic species, even if the accounts are sensationalized. Ultimately, for Arkansas baitfish farmers, ANS could become a marketing issue, and individual farms may want to consider developing a HACCP plan as a proactive measure. For more information on this option, contact your Extension aquaculture specialist in Lonoke or Pine Bluff.

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Spring Viremia of Carp Virus and Arkansas Fish Production

Andy Goodwin, Professor of Fish Pathology

Politics and History of SVCV

The Spring Viremia of Carp (SVC) Virus (SVCV) has never been found in Arkansas, but the recent discovery of SVCV on a fish farm in North Carolina and in the wild fish of Wisconsin may complicate selling and moving cyprinid fish within the United States.

There are two reasons that SVCV will have such a great impact. First, it is one of the top five most heavily regulated fish viruses in the world. When SVCV is reported in a new country or region, it activates a disease control and eradication bureaucracy both in the U.S. and internationally. Secondly, the reason that SVCV ended up on the top five fish viruses list is because it is a nasty virus with the potential to inflict high mortality on infected fish populations. To minimize the impact of SVCV on Arkansas fish producers, it is critical for farmers to take proactive steps to convince regulatory agencies and customers that Arkansas fish are completely safe and superior to wild fish in environmental impact and safety.

To explain why SVCV is so important, we need to look at international laws, state laws and the biology of SVCV. It has been a significant problem in Europe for centuries. Its primary impact has been on cultured common carp. In Europe, SVCV has not been implicated in deaths of wild fish. The virus is known to kill a variety of cultured fish including cyprinids like common carp, koi, grass carp, and goldfish. It has also been reported to kill the European Wels catfish (the "sheatfish") and, in a Hawaiian outbreak, marine shrimp. There are other reports involving experimental infections of a diverse group of fish species. Very little work has been done on the sensitivity of North American fishes to SVCV, but the European experience would indicate that the virus is probably capable of infecting many cyprinid fish.

In North America, SVCV was first discovered in the spring of 2002. The University of Arkansas at Pine Bluff Fish Disease Diagnostic Laboratory was called to investigate the cause of koi carp losses on a North Carolina farm. Several lots of those fish were positive for SVCV. Since then, it has been discovered in fish from a major carp kill in Cedar Lake, Wisconsin. Additional surveys completed since that time have implicated SVCV in fish kills in other Wisconsin waters. The Wisconsin outbreaks have no association with aquaculture and, since they happened in wild fish, represent a departure from the behavior of the disease in Europe.

Because the SVCV in North Carolina and Wisconsin represented the first isolations of this exotic virus on our continent, its discovery triggered a lot of national and international activity. The isolation had to be reported to the USDA-APHIS and that agency had to report to the OIE. APHIS is responsible for controlling the movement of animal and plant diseases within the U.S. and across our international borders. The OIE is an international organization that publishes guidelines for dealing with international movements of animal diseases. It does not make laws or regulations, but OIE guidelines are critical parts of international agreements on trade. In the case of SVCV, the OIE designates an international reference lab, describes appropriate diagnostic procedures, issues guidelines for defining what an SVCV-free zone might be and keeps track of where SVCV is present.

The U.S. was an SVCV-free zone, therefore APHIS was required to

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report that the U.S. now has SVCV. Our trading partners will decide how to react to that news. APHIS is responsible for deciding how to handle the outbreak on the fish farm (ignore, quarantine, or eradicate) and to work with USFWS and state authorities on a plan to deal with SVCV in the wild.

If APHIS decides to eradicate SVCV from commercial aquaculture, a part of that eradication plan may include disease inspection requirements governing the movement of fish within the U.S. and across international borders. This may mean additional hassle for farmers moving fish and will provide some impetus for individual states to revise their import requirements.

SVC: the Disease

SVC multiplies in fish during the winter, and then kills fish in the spring as the water warms. It is possible for outbreaks to occur in the fall if temperature patterns are right. The most likely temperature range for SVC fish kills is 10-20^{o}C (60-70^{o}F). Fill kills occurring at temperatures greater than 70^{o}F are not likely to be SVC. Lesions on fish infected with SVCV look a lot like fish with other bacterial or parasitic diseases and do not serve as useful indications that the disease is present. Typical signs are swollen abdomen, red patches on the skin, and red spots on the swim bladder. When temperatures are right, mortality may be very high.

Preventing SVC Problems

The only way to prevent SVCV problems is to avoid introducing the virus. A previous article in *Arkansas Aquafarming* (also published on the web at http://www.uaex.edu/biosecurity/producer/fish_farms.asp) detailed "biosecurity" measures that will prevent the introduction of SVCV. It is clear that any new fish, especially carp or koi, are potential sources of the virus. Equally important, the recent outbreaks in Wisconsin have made it clear that surface water supplies are risky and that well water and water recycled within a farm are far safer.

The best news for Arkansas is that European SVCV experts believe the virus will not survive for long periods in the southern U.S. where summer water temperatures are high. If that is correct, then virus introduced in the fall might propagate through the winter and kill fish in the spring, but it is unlikely to survive through the summer. The problems with SVCV in Wisconsin may be related to the cooler climate. Lower temperatures may also have played a role in the North Carolina outbreak because much of the water used by the farm was drawn from coolwater streams. This is very encouraging for the Arkansas industry that is well isolated from cool water, but it should in no way be regarded as a guarantee that we won't have to face SVCV problems. Remember, SVCV has already behaved differently in Wisconsin than in Europe.

Dealing With SVCV-Related Regulation of Fish Movements.

It is likely that many states will require some sort of SVCV certification of fish to be imported. A lot by lot inspection is possible, but given that SVCV virus cannot be found in the summer when it is hot and that lot inspections are cumbersome and less reliable, it makes sense to use farm certifications instead.

The UAPB Fish Disease Diagnostic Program has been approved by APHIS to inspect farms for SVCV since 1996. Under this program, an APHIS-approved veterinarian visits the farm twice a year and supervises the collection of a sample of 150 fish. This sample is sent to UAPB where it is inspected for fish viruses (due to the expense of this procedure, we do charge for this service). The results are reported to the farm, the veterinarian, and APHIS. For the next six months, the farmer can obtain official USDA paperwork saying that his farm has been found to be free of SVCV and other viruses. The main goal of this program is international export, but many farms have found that the certification is an advantage for interstate shipping, too. One Arkansas farm has been inspected twice a year since 1996 and was in an excellent marketing position following the report of SVCV in North Carolina. At least seven additional farms joined the program this past fall. If a farm is confirmed positive for SVCV, we would notify APHIS and decisions regarding future fish movements would be up to them.

While it is not yet clear that the APHIS inspection program will meet all of the requirements of future state regulations, a history of farm inspections is a powerful tool for negotiations with customers and regulators. It may also play a valuable role in a more comprehensive bait certification program that might include viruses, exotic fish species, zebra mussels and invasive aquatic plants. There is no doubt that farm-raised fish are superior to wild-caught even if the only consideration is the impact of removing large numbers of the fish from the wild. Perhaps the time has come to document and market the important health and exotic species advantages of the farm raised product.

Arkansas farmers interested in beginning farm inspections for SVCV should contact Andy Goodwin at the UAPB Disease Laboratory (870-543-8137, agoodwin@uaex.edu). Those concerned about future interstate regulations or interested in talking about a baitfish certification program should contact Eric Park, president of the Arkansas Bait and Ornamental Fish Growers Association (501-231-8607).

(See photos on page 8)

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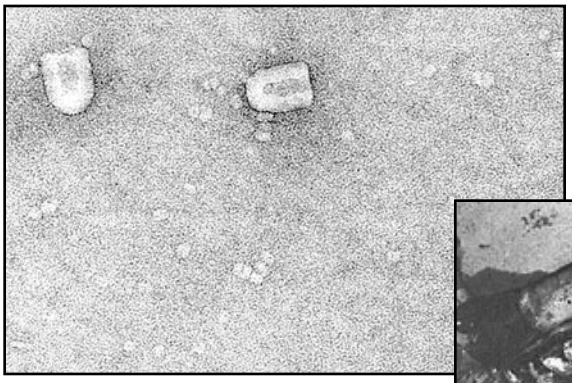
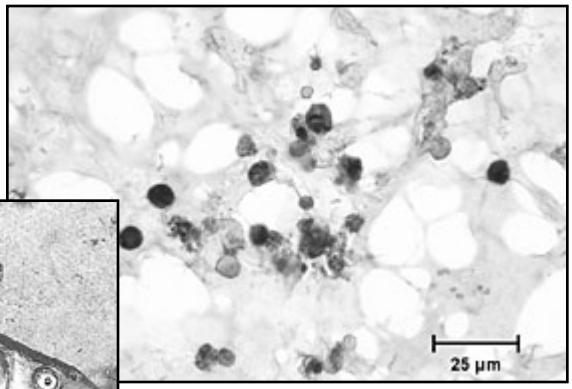


Electron microscope picture of bullet-shaped SVCV.

Carp and tench with SVCV disease.



Diagnostic test showing fish cells stained black for SVCV.

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