EXTENSION NEWSLETTER

Cormorants and Their Control in Aquaculture

Brian Dorr, Paul Burr, USDA/ Wildlife Services/National Wildlife Research Center

Cormorants and their close cousins— shags— are primarily fish-eating birds that are distributed worldwide. The double-crested cormorant (*Nannopterum auritum*) is the most numerous and widely distributed of the six native North American cormorant species. Double-crested cormorants get their name from the feathery crests that form over each ear during the breeding season. These crests only develop on mature breeding adults and are typically black or white in color. These large (5 -6 lbs.), mostly brown or black, birds are commonly seen on large rivers and lakes, although they may occur on smaller streams and ponds if food is available. While double-crested cormorants (hereafter, cormorant) primarily eat fish, they are not averse to crawfish, shrimp, and similar crustaceans. Cormorants aren't picky when it comes to what type of fish they eat. More than 250 different fish species are known to be eaten by these birds. In total, cormorants eat about 1lb of food per day to maintain themselves.

Cormorants are commonly seen throughout N. America with the largest population residing east of the Rocky Mountains. Cormorant populations have fluctuated greatly in the past. In fact, during the 19th century cormorant numbers began to decline to the point where they were eventually listed as 'special concern' in several states in the 1970s. However, cormorants have since made a recovery, largely due to environmental protections. Breeding information suggests their numbers are continuing to grow. Like a lot of waterfowl, cormorants tend to nest in the northern U.S. and Canada (e.g. Great Lakes, prairie pothole region) and migrate south during the winter months. Like other colonial waterbirds (e.g. herons, gulls, pelicans), they nest in groups that can vary in size from a dozen to thousands of nests. Cormorants tend to nest in trees on islands free of mammalian predators although they will readily nest on the ground.

Double-crested cormorants are a native bird species and are important indicators of environmental health. However, with the cormorants increasing abundance has come increased negative societal views of these birds. A big part of these negative views is associated with their impacts to sportfisheries, co-nesting bird species, and aquaculture farms. Most sportfisheries issues occur up north and are associated with large cormorant nesting colonies. Anglers often worry about the impact cormorants may have on their fishing opportunities (e.g., for perch, walleye, etc.). Likewise, impacts to nesting habitat and co-nesting species mainly occur on the breeding grounds where cormorant droppings can kill trees and vegetation, negatively affecting other birds that rely on such habitat. When cormorants fly south for the winter, they pass through large areas of aquaculture production, particularly in the southeastern U.S., much to the consternation of aquaculture producers.

When cormorants migrate south to their wintering grounds in the southeastern U.S. and the Gulf Coast they usually roost at night in Cypress and Tupelo trees over water in various bayous, sloughs, and swamps of the south. Their numbers in these night roosts can vary from a dozen, to well over ten thousand individuals. After resting overnight, these birds will leave their roosts and look for places to eat. Most birds will forage within 5 to 10 miles of a roost site, but they can travel much further if necessary. It's when these birds roost near aquaculture farms that they present the biggest issue for aquaculture producers, as the closer they are to farms, the more catfish they eat. Many a farmer has seen the ragged v-shaped flocks of cormorants flying from or to roosts and over their farms.

Cormorants have caused considerable depredation and economic loss to catfish producers over the years. The most recent estimates put the industry-wide, value of catfish losses due to cormorants at an average of $47.2 million dollars, not counting bird scaring costs. Those on-farm bird scaring costs can be substantial, adding, on average, another $17.5 million dollars annually to industry-wide costs, although not all due to just cormorants. On-farm management using pyrotechnics, propane cannons, and a wide variety of non-lethal methods, supplemented by permitted lethal take to limit habituation by the birds, are the most common tools producers use to reduce depredation. An off-farm technique that is also effective is to disperse cormorants out of night roosts near aquaculture farms and push them to areas where they will forage in more natural habitats away from aquaculture. Most roost dispersal efforts are conducted by the U.S. Department of Agriculture, Wildlife Services.

As a native bird species, double-crested cormorants, like most birds in North America, are protected under the Migratory Bird Treaty Act. Therefore, any lethal removal of cormorants requires federal and state permits. Contact your university Extension aquaculture specialists and USDA Wildlife Services state programs for technical assistance and help with cormorant damage management.

ACES Offers Online Program on Basic Estate Planning

Alabama Extension is offering a live, on-line two-hour estate planning program at 7:00 p.m. on December 9th.

Planning for your eventual death and possible incapacity is more important than ever during this pandemic. It is always more expensive to die without a Will than the cost to prepare one, and the administrative headache to die without a Will is a burden you don't want to leave to your grieving family.

The program will describe the problems you create when you do not have a Will, how your assets are distributed if you do not have a Will, and the three documents that should be in your estate plan—an Advance Directive for Health Care, a Power of Attorney, and a Will.

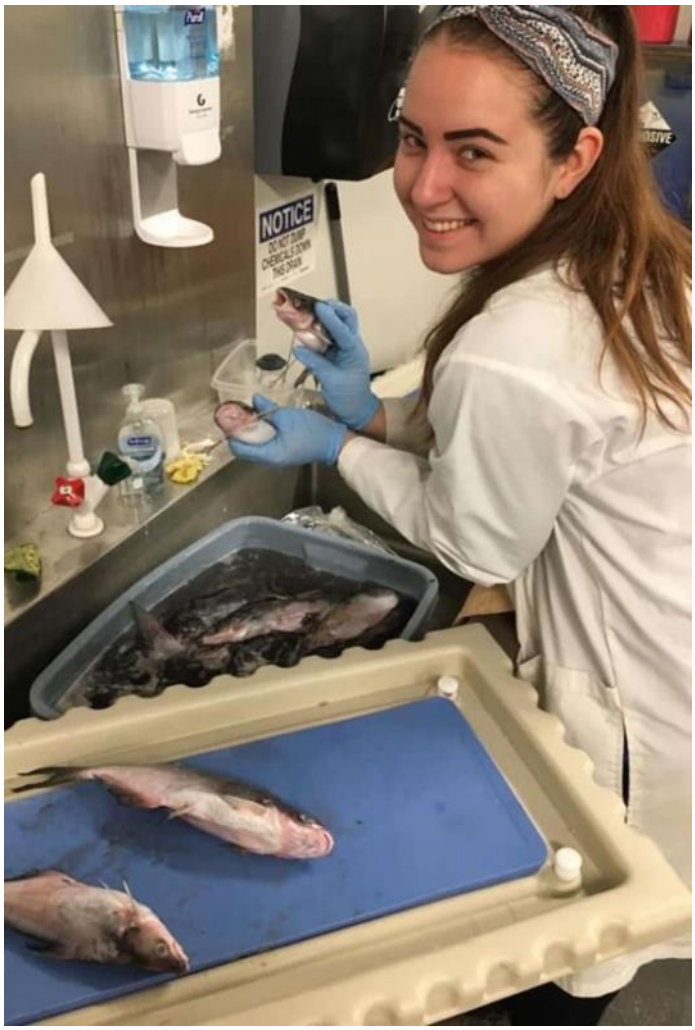
New Additions to Staff

Dr. Tham Hoang received his Doctoral Degree in Environmental Toxicology from Clemson University in 2006. Before joining Auburn's School of Fisheries, Aquaculture, and Aquatic Sciences as an Associate Professor in June 2021, he was an Associate Professor at Loyola University Chicago. His research focuses on the influence of water quality and sediment and soil characteristics on the bioavailability and toxicity of metals and organic pollutants including emerging contaminants, such as microplastics, on living organisms. More specifically, his research helps:

- determine the bioavailability, bioconcentration and bioaccumulation of contaminants in the environment,
- evaluate potential toxicity of individual and mixture chemicals in water, sediment, soil, and diets to living organisms,
- understand the toxicity mechanism of pollutants,
- evaluate the toxicity of effluent wastewaters and determine causative agent(s) through toxicity dentification and evaluation methods,
- prepare ecological hazardous and risk assessments for aquatic and terrestrial environments, and
- provide guidance to optimize efficiency of site cleanups and assist in development of environmental quality guidelines to protect living organisms in natural ecosystems.

He has developed wide network connections and collaborations with colleagues in the U.S. and other countries around the world in the past 15 years. He will continue to collaborate with his peers and new colleagues at Auburn University to do research and educate students in the field of environmental toxicology and risk assessment to support development of relevant environmental quality guidelines to protect living organisms from pollution and promote environmental resilience and sustainable development at large.

Dr. Hisham Abdelrahman has joined the AFFC as a postdoctoral fellow. Dr. Abdelrahman will be studying systematic approaches to prevent and mitigate the formation of antimicrobial resistance in catfish aquaculture and will also be investigating historical patterns of fish disease outbreaks in west Alabama over the last 35 years. Finally, he will be assisting staff and graduate students at the AFFC with a number of different ongoing projects in aquaculture. Before joining the AFFC, he was a lecturer at Faculty of Veterinary Medicine, Cairo University, Egypt. He earned a Ph.D. in Aquaculture (2016) and Master's in Statistics (2015) from Auburn University and a Bachelor and Master's degree in Veterinary Medicine from Cairo University, Egypt.



Julia Palmer joined the Alabama Fish Farming Center and the School of Fisheries, Aquaculture and Aquatic Sciences at Auburn in August to complete a Master of Science degree. Julia is originally from Buffalo, New York and completed her B.S. in Environmental Science at Georgia Gwinnett College in Lawrenceville, Georgia. While there, Julia worked in the laboratory of AU Fisheries alum Dr. Peter Sakaris to complete an undergraduate research project on age and growth of invasive blue catfish in the Satilla River. Her thesis project aims to use electrofishing techniques to sample commercial catfish ponds to determine the age structure of hybrid catfish that evade harvest and remain in ponds to grow beyond marketable size. The Fish Center hopes to use a recently acquired electrofishing boat to help answer a number of other questions related to harvest efficiency in commercial catfish ponds. Julia plans to secure a job with a state DNR, U.S. Fish and Wildlife, or a private company where she can have an impact on the field of fisheries by carrying out field work with native and invasive fish species in natural systems.

ACES Offers Online Program on Year-end Tax Planning

Alabama Extension is offering a live, on-line two-hour program on Year-end Tax Planning for Farmers at 7:00 p.m. on December 2nd.

The business of farming provides more opportunities to schedule the recognition of income and expenses than any other business. Hopefully you will have this conversation with your accountant some time before the end of the year. If you do not have an accountant, if might be worth your time to join us for this program.

We will discuss methods to defer taxes including constructive receipt, income averaging, installment sales, pre-paying expenses, and retirement plan contributions. We will also discuss accelerating depreciation, self-employment tax planning, hiring your children, weather-related livestock sales, sale of farm assets, treatment of crop insurance and disaster payments and net operating losses.

Speaker: Robert A. Tufts has been an attorney for 24 years. He also has a PhD in Forestry and a Master of Laws in tax. He taught at Auburn University for 36 years and is currently Visiting Professor in Extension on the Farm and Agribusiness Management Team.

There is $10 fee for this class and registration required. To register please go to the following link:

https://secure.touchnet.net/C20021_ustores/web/product_detail.jsp?

Alabama Catfish Industry Update

Terry Hanson, SFAAS

U.S. farm-raised catfish is the seventh most popular item of all fish and seafood products consumed in the U.S. Americans eat 19.2 pounds of fish and seafood per person per year and each American eats a little over one-half pound of U.S. farm-raised catfish annually. Ninety-three percent of all catfish grown in the U.S. was produced in Mississippi (59%), Alabama (29%) or Arkansas (5%). In 2020, the U.S. farm-raised catfish industry produced 324 million pounds of catfish from 59,305 acres of water and the industry is on track to produce the same amount in 2021. Alabama ranks sixth in total U.S. aquaculture production. Annual Alabama production of catfish was 94 million pounds, worth $99 million, in 2020.

The Alabama (and U.S.) catfish industry faces some serious issues. In the early 2000s, more than 25,000 water acres were in production in Alabama, including approximately 250 catfish farms in west Alabama and four processors. By 2020, this had declined to 66 farms, 15,600 water acres, and two catfish processors. So, why the decline? There are four core issues, revolving around feed prices, foreign imports, economic forces, and disease losses.

Feed fed to catfish primarily consists of soybean meal, corn and wheat midlings. Feed prices are related to those commodity prices and are subject to swings throughout the year. Catfish feed represents approximately 50% of the operating expenses required to produce a crop of fish. In 2020, the annual 32% crude protein feed price was $389 / ton, and the 2021 feed price average through September was $493 / ton. In February through June, feed prices were over $500 / ton but have come down to the $470 to $484 range in July through September 2021. Farmers have to feed fish to have a crop, so they have been careful in their feeding approach. Luckily, fish prices have risen this year and have helped offset some of this higher feed cost. The processor price paid to the producer for live catfish averaged $1.27 / lb pound (through September 2021), compared to $1.16 / lb in 2020, $1.05 / lb in 2019, and $0.99 / lb in 2018.

Secondly, inexpensive imports (mainly from Vietnam and China) have flooded the U.S. marketplace with alternative catfish-like products, such as tra, swai, and basa. Imports of frozen fillet products to the U.S. were over 200 million pounds in 2020. In 2021, imports are 42% higher than in 2020 (through September). Promotional programs through ALFA, ACP (Alabama Catfish Producers) and The Catfish Institute have helped keep the quality and locally grown U.S. farm-raised catfish product in the minds and mouths of Americans.

Third, other economic forces affect the U.S. catfish industry as it does other agricultural industries. The quantity of U.S. round weight catfish processed in 2020 (317 million lb) was 7% lower than in 2019 (340 million lb) and much of this could have been due to the COVID-19 pandemic with its decline in food service and restaurant sales. However, in 2021 this has improved, with supermarket and retail outlets that have catfish products making strong comebacks.

Fourth, Alabama catfish production losses due to diseases are a chronic problem. Disease related losses are approximately $13 million annually in Alabama, and occur at this scale in Mississippi and Arkansas as well. Losses have been particularly heavy due to a virulent strain of *Aeromonas hydrophila* bacteria introduced from China. Fortunately, collaborations between Auburn University's School of Aquaculture, Fisheries and Aquatic Sciences, the Alabama Fish Farming Center, and the USDA Agricultural Research Service / Aquatic Animal Health Research have developed disease monitoring programs, vaccines and vaccine delivery methods that are mitigating these losses.

Even with all these issues, the Alabama catfish industry is alive and well, producing healthy, tasty catfish! Eat some catfish this week!

Managing Your Recreational Ponds for Wildlife

Bence Carter, Alabama Cooperative Extension Service

A small pond or impoundment on your property can be an asset not only as a place to pass time between hunting seasons but also as a habitat enhancement for wildlife. Year-round benefits include creating a place to enjoy fishing and the outdoors and providing a natural attraction with essential water for wildlife.

Although deer get most of their daily water through the vegetation they consume, they still use water sources, such as streams, puddles, and ponds, to obtain their required daily intake. Wild turkeys, on the other hand, rely heavily on water sources and remain within close proximity. Water sources provide essential sources for feeding, nesting, loafing, and cover for waterfowl species.

One of the basics to maximizing the attractiveness of your pond to wildlife involves increasing herbaceous or leafy plants. Promoting grasses and forbs rather than brushy, woody vegetation, will provide food sources, nesting, and escape cover. Plus, it offers a vegetated buffer for water runoff into the pond. This buffer area will help improve water quality by filtering excess nutrients and sedimentation from water runoff, which, in turn, will decrease water cloudiness and be more attractive to waterfowl. As a pond owner, you can manage and encourage this type of vegetation around your ponds in several ways. Mechanical practices include disking, prescribed fire, and mowing. Disking encourages establishment of early successional, herbaceous plants that typically have an abundance of seeds that provide food for birds and wildlife. To maximize establishment of these types of plant species, disk in the late fall and every few years to deter woody, brushy plant growth. Fire can be used in place of disking in areas that are not accessible by equipment. Fire and disking will also increase the abundance of invertebrate species that are an essential food source for developing juvenile turkeys and waterfowl.

Mowing can be effective in preventing growth of nuisance vegetation and in reducing dense, continuous vegetation to ensure increased landing and foraging access. Avoid mowing during the spring and early summer when birds will be using grassy areas for nesting. A selective herbicide application may also be necessary if undesirable or invasive species establish.

Mast-producing plants are a good enhancement around ponds. A variety of species will maximize available food types and sources year-round. Examples of trees that produce hard-mast and that prefer lowland sites with moist, well-drained soil are cherrybark oak (*Quercus pagoda*), willow oak (*Quercus phellos*), water oak (*Quercus nigra*), pin oak (*Quercus palustris*), chinkapin oak (*Quercus muehlenbergii*), and swamp chestnut (*Quercus*

michauxii). For areas around your pond that have wet, poorly drained soils, overcup oak (*Quercus lyrata*) and nuttall oak (*Quercus nuttallii*) are great options. Examples of soft-mast species that can be planted or encouraged to establish around ponds and that are beneficial to wildlife include American persimmon (*Diospyros virginiana*), crabapple (*Malus* spp.), pawpaw (*Asimina triloba*), osage orange (*Maclura pomifera*), blackberry (*Rubus* spp.), American beautyberry (*Callicarpa americana*), sumac (*Rhus* spp.), and elderberry (*Sambucus* spp.). Only grassy vegetation should be planted or allowed to establish on dams. Tree roots have the potential to compromise the structural integrity of a dam.

Waterfowl also prefer shallow areas of the pond that they can use for wading and foraging. Over time, sediment will collect in upstream areas of the pond, resulting in shallow areas. These shallow areas are forage locations for waterfowl searching for invertebrates. Pond owners can also use water management practices in these shallow areas to increase the types of aquatic vegetation, which typically have seeds high in nutrients.

Drawdown is a practice of gradually decreasing the water level to expose shallow areas of a pond. This practice can increase nutrient retention, stimulate seed development and establish mud flats for wading birds. You can allow vegetation to establish naturally, or if the pond bottom has sufficiently dried, disking can encourage vegetation to establish. Plant species that are beneficial to waterfowl is another option. Examples include species in the genus *Sagittaria* (arrowhead or bull tongue and duck potato), sago pondweed (*Potamogeton pectinatus*), eel grass (*Vallisneria* spp.), sedges (*Carex* spp.), cattail (*Typha* spp.) and wild rice (*Zizania* spp.). If you are managing the pond for fishing, allow at least 50 percent of the pond to remain with a depth of at least 6 to 7 feet to reduce the chance of fish dying off during a drawdown.

When encouraging plant establishment in a drawdown, keep in mind that a heavy vegetative cover can result in decreased waterfowl use. During a drawdown, landowners will also likely have to manage for undesirable, aquatic weed species that may establish. An approved aquatic selective herbicide may need to be used to manage for nuisance aquatic weed species. If you are in an area where fire ants are common, you will need to manage for this pest. If fire ants can establish, they will form floating balls when water levels begin to rise, and these floating balls are potentially targeted by fish. Ingesting too many fire ants at one time can result in killing the fish.

Whether your goals are to increase habitat for wildlife, manage your recreational pond for fishing—or a little of both, these practices will maximize the benefit from your pond. Before beginning work, establish the goals for your property and the management strategies that will meet all the determined goals. Contacting your county Extension office or state wildlife biologist is a good way to begin the process of getting year-round use of your property's pond.

Emergency Loss Assistance Coming Soon for Farm-Raised Fish

Terry Hanson, SFAAS

U.S. aquaculture industries have been trying to get government financial assistance for catastrophic losses for a long time. It took large losses resulting from the February 2021 winter storms hitting states along the Gulf of Mexico to get such assistance that had been provided to livestock and honeybee producers for many years. The emergency financial assistance U.S. farm-raised fish industries have been seeking will finally be available.

On May 13, 2021, the U.S. Department of Agriculture's (USDA) Farm Service Agency (FSA) announced a policy change to the Emergency Assistance for Livestock, Honey Bees and Farm-raised Fish Program (ELAP) https://www.fsa.usda.gov/news-room/news-releases/2021/usda-expands-aquaculture-disaster-assistance-to-include-fish-raised-for-food that makes fish raised for food and other aquatic species eligible for disaster assistance when declared by the US Secretary of Agriculture. In Alabama, this includes farm-raised catfish, an industry that produces more than 90 million pounds worth $99 million annually. Previously, only farm-raised game and baitfish were eligible for death loss ELAP payments. Since June 1 2021, eligible aquaculture producers can request ELAP assistance for 2021 losses of aquacultured food fish.

Traditionally, ELAP provided financial assistance to producers of livestock and honeybees for certain adverse weather events or loss conditions, including blizzards and wildfires. Examples of past ELAP financial assistance provided for livestock feed and grazing losses; losses resulting from the transporting of water to livestock due to an eligible drought; losses resulting from gathering livestock for treatment and/or inspection related to cattle tick fever, and honeybee feed-colony-hive losses. Now, ELAP will provide financial assistance for specified aquaculture food fish death losses and feed losses.

Aquaculture producers can apply to receive ELAP assistance at local FSA service centers. The ELAP application period ends December 31 of each calendar year. To be eligible, fish raised for food losses must have occurred on or after January 1, 2021. FSA is waiving the requirement to file a notice of loss within 30 calendar days of when the loss is apparent, but only if the loss occurred prior to June 1, 2021. Thereafter, losses will need to be reported to FSA within 30 days (producer will need to contact their local FSA office). For 2022, losses will need to be reported within 30 days of losses. An aquaculture producer will need to provide records upon request to document the eligible loss event and demonstrate the beginning and ending fish inventories. Producers with an average adjusted gross income (AGI) that exceeds $900,000 are not eligible to receive ELAP payments. Visit fsa.usda.gov/payment-limitations for more details on payment limitations.

ACES Offers Online Program on Trusts in Estate Planning

Alabama Extension is offering a live, on-line two-hour program on Using Trusts in Estate Planning at 7:00 p.m. on December 16th.

The purpose of a trust is to hold property after your death and distribute that property some time later based on the passage of time or the occurrence of a condition. For example, the trust could hold property until your youngest child reached the age of 21 years, or the trust could hold assets until your child graduated from college, got married, etc.

The program will describe the tax and non-tax uses of trusts and the different types of trusts. Trust provisions typically used by individuals will also be explained.

Catfish Columnaris Disease Cases Dominated by One Genetic Type of Flavobacterium Columnare

Ben La Frentz, USDA-Agricultural Research Service

Columnaris disease, caused by the bacterial pathogen *Flavobacterium columnare*, continues be the second leading cause of disease related mortality in the catfish industry. Our research revealed that there are four different types of *F. columnare*. Historically, three of these types have been found to be associated with disease in the catfish industry; however, the type currently impacting the industry is not known. We pioneered genetic tools to rapidly assign an unknown *F. columnare* strain to one of the four types. These tools were used to determine the type(s) of *F. columnare* impacting the industry by investigation of 260 columnaris disease cases in Alabama and Mississippi. The results confirmed the historical records that three types are present but demonstrate that genetic group 2 *F. columnare* dominates columnaris disease cases in the catfish industry (94% of cases were assigned to type 2 *F. columnare*; (Fig. 1). Our current research is using this new knowledge to develop vaccines and other prevention and control strategies for the catfish industry by focusing on type 2 *F. columnare.*

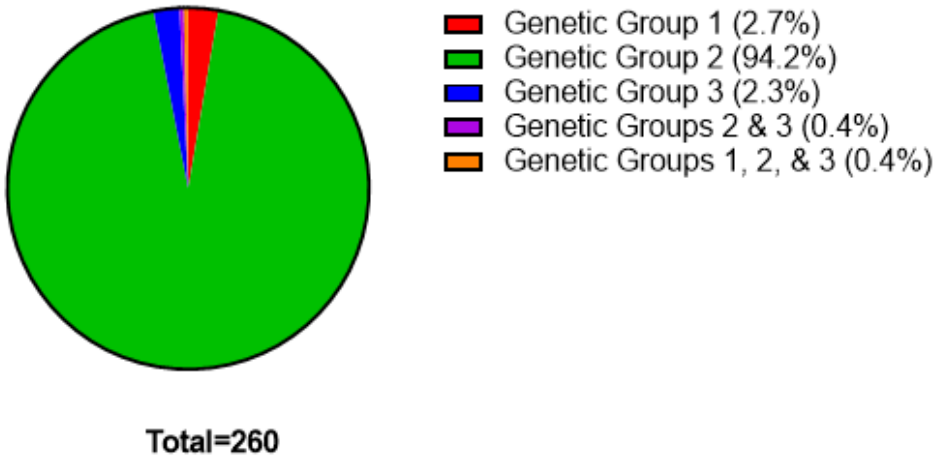


Fig. 1. Percentage of columnaris disease cases assigned to the four types of *F. columnare*.

Managing Chloride Levels in Catfish Ponds to Prevent Nitrite Toxicity and Brown Blood Disease

Luke Roy, Alexis Weldon, Anita Kelly, Timothy J. Bruce, SFAAS

The management of nitrogenous wastes in catfish ponds is a reoccurring thought in the minds of producers each production season, particularly in the warmer months during peak feeding season. The Alabama Fish Farming Center also routinely observes high nitrite levels from water samples of commercial catfish ponds in the Fall each year when water temperatures begin to decline. As temperatures drop, bacteria that convert ammonia to nitrite and nitrite to nitrate do not process these wastes as quickly as in the warmer months. This can create a "stall" in the processing of waste, leading to nitrite build-up in the system. The sources of nitrite in catfish ponds primarily originate from the decomposition of fish waste derived from commercial feed by bacteria. During peak feeding season, large amounts of feed are required to maximize catfish growth. Since the protein in feed is largely made up of nitrogen, nitrogenous wastes are a byproduct of this process that must be closely managed. There can be other sources of nitrite as well, including decomposition of fish following a fish kill and large-scale algae die offs in the pond.

Concurrent with high nitrite levels in ponds, producers may see negative impacts on fish health. Brown blood disease, also known as nitrite poisoning, can lead to mortality events due to an accumulation of nitrite in the catfish tissues. Nitrite is taken up by the gills and enters the bloodstream. Once nitrite is in the bloodstream, it oxidizes hemoglobin in the red blood cells to methemoglobin. Methemoglobin cannot transport oxygen like hemoglobin, and as a result, tissues are deprived of oxygen. While oxygenated hemoglobin is red, methemoglobin is brown. When fish suffer from high nitrite levels in the water, the blood and gills will take on a dark brownish color, hence the name brown blood disease. The catfish may show signs of low oxygen stress even if the water is saturated with oxygen. Fish essentially suffocate because their blood cannot take up sufficient oxygen.

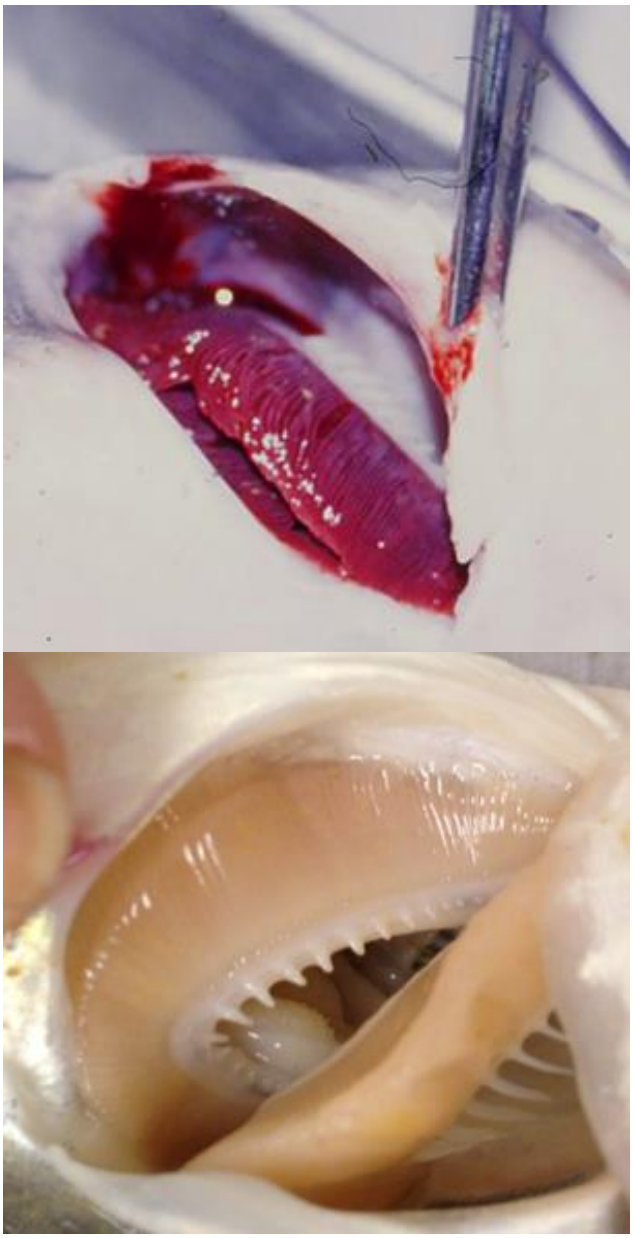


Fig. 1. Normal channel catfish gill color (top) and gills affected by brown blood disease (bottom).

It is also important to note that there may be varying degrees or even an absence of the clinical signs associated with brown blood disease. There-

fore, it is critical to perform water quality testing regularly in the Fall and observe fish behavior to stay ahead of potential mortality events.

Fortunately, brown blood disease is a problem that can be easily prevented by managing chloride levels in commercial ponds. Because salt contains chloride, you can increase chloride levels by adding salt to fish production ponds. Maintaining a chloride to nitrite ratio of 10:1, or a general rule of thumb, is maintaining a chloride concentration of 60-150 ppm, prevents nitrite from being absorbed through the gills. At the AFFC, we typically recommend producers keep chloride concentrations at least above 60 ppm, but preferably above 100 ppm to protect against periods of heavy rain that can dilute the chloride level in ponds. Typically, it takes 4.5 lbs/acre-foot of salt in a pond to increase the chlorides by 1 ppm. Knowing this factor makes it possible to calculate the amount of salt necessary to increase the chloride level in a pond to a given concentration.

As an example calculation, let's assume a farmer brings in a pond water sample to the AFFC, and upon testing, it is determined to have 30 ppm chloride. The pond is 8 acres and 4 ½ feet deep (8 acres * 4 ½ ft = 36 acre-feet). The farmer has decided to play it safe and raise the chloride level to 100 ppm. So, the farmer needs to add 70 ppm of chloride to the pond to raise the level to 100 ppm (100 ppm – 30 ppm = 70 ppm).

4.5 lbs of salt/ 1 acre foot * 36 acre feet * 70 ppm = 11,340 lbs of salt or 5.67 tons

If the fish have bacterial or parasite problems, they may be more sensitive to nitrite, so chloride levels will need to be even higher than normal to prevent brown blood disease. Conversely, the same is true, as fish with high nitrite levels can also be more susceptible to pathogens in the pond due to their stressed state. Even though salt has become more expensive recently, prevention is typically less costly than treatment after brown blood disease becomes a problem. Maintaining chloride levels above the desired threshold can prevent considerable monetary losses from direct fish loss and indirect losses such as increased disease problems brought about by nitrite stress. Successful farm managers routinely measure chloride levels, particularly during the months when nitrite is most likely to be dangerously high.

Perhaps the best time to test chloride levels in catfish ponds is in the early Spring, but checking in the early Fall can help identify ponds with low chloride levels that could be potential problems before going into the winter. Salt prices have been fluctuating recently and there have been major supply issues that have driven up the price, making salt much more challenging to come by. If you want to check the chloride levels in your ponds, drop your samples by the AFFC.

Water Hyacinth

Anita Kelly, AFFC

Water hyacinth was introduced into the U.S. in 1884 at the Cotton States Exposition in New Orleans as an aquatic ornamental plant. Since then, it has spread rapidly throughout the southeastern U.S. Water hyacinth is an aggressive invader and can form thick mats. If these mats cover the pond's entire surface, they can cause oxygen depletion and fish kills. Therefore, water hyacinths should be controlled so they do not cover the whole pond.

The active ingredients that have been successful in treating water hyacinth include, but are not limited to Diquat (Rated: Excellent), Glyphosate (Rated: Good), and 2,4-D (Rated: Excellent).

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