

EXTENSION



NEWSLETTER

Auburn Welcomes New Economist



Taryn Garlock can be reached at 211 Swingle Hall, Auburn Univ., AL 36849 or taryngarlock@auburn.edu
C: 334-740-6508

Dr. Taryn Garlock joined the School of Fisheries, Aquaculture and Aquatic Sciences as an Assistant Professor and Extension Specialist in August 2023. Taryn specializes in aquaculture and natural resource economics and is located on the main campus in Auburn. Prior to joining Auburn, she was a Research Scientist at the University of Florida where she conducted profitability analysis of Florida aquaculture sectors, studied developments in seafood markets, and examined barriers to domestic aquaculture production. She received her Ph.D. from the University of Florida in 2015, where her dissertation research used multidisciplinary approaches to assess the effectiveness and efficiency of fish stocking as management tool for recreational fisheries.

Taryn is developing a research and extension program at Auburn to address economic issues identified by Alabama producers and stakeholders. Her work will improve our understanding of the economic efficiencies of new or improved production systems and practices and identify opportunities to reduce economic risk in aquaculture. Her long-term goal is to support profitable and sustainable fisheries and aquaculture development in Alabama and the United States.



2024 Alabama Catfish Conference

Thursday, January 11, 2024, 8:00am
Blackbelt Research & Extension Center
60 County Road 944, Marion Junction

Partial Replacement of Fishmeal with Soy-based Proteins in Cultured Largemouth Bass

Jamison L. Semla¹, Brent M. Vuglar¹, Benjamin R. LaFrentz², Donald A. Davis¹, Ian A. Butts¹,
and Timothy J. Bruce¹

¹SFAAS, ²USDA- Agricultural Research Service

Millions of anglers have idolized largemouth bass as a trophy fish. Over the past decade, it has become a highly desired and favored freshwater species for aquaculture production. This is due to its fast growth rates, short rearing cycles, and white, mild-tasting fillets. In modern times, the price of fishmeal has increased exponentially, and the search for new aquafeed protein sources is essential in keeping operational costs low. Moving further into the future, we must move towards more cost-effective alternative feed sources to

have a more sustainable aquaculture industry and maximize fish production. One avenue is to investigate renewable resources such as plant-based materials, and soybean meal offers an excellent alternative protein source. Over the past few decades, soybean prices have remained relatively stable, making this source efficient and sustainable. Soybean protein has worked well for many other freshwater fishes, such as salmon, trout, tilapia, and catfish. The largemouth bass aquaculture industry has grown in the past decade, and the high price their

fillets bring to the market is lucrative to producers expanding their species offerings. Implementing alternative proteins such as soybean meal will make the production more sustainable and could offer great potential in growth performance and overall better health in this species. This is all while keeping the cost of fish production more affordable.

The Soy Aquaculture Alliance recently funded a project investigating the growth and health of largemouth bass, which involves several investigators from Auburn University School of Fisheries, Aquaculture, and



Figure 1. (Left) Making diets containing different soy process variants. (Right) Feeding largemouth bass.

Aquatic Sciences and the USDA-ARS Aquatic Animal Research Station in Auburn, Alabama.

At the E.W. Shell Fisheries Center at Auburn University, the team has been evaluating the growth performance of cultured Florida largemouth bass fingerlings in recirculating aquaculture systems (RAS). Menhaden fishmeal-based protein was partially replaced with different soy process variants, including a soybean meal (SBM), a fermented soybean meal (FSBM), and a commercial soy protein concentrate (SPC; Figure 1). Fish were fed experimental diets and a basal (control) diet to apparent satiation daily across four replicate tanks. Every two weeks, growth performance was assessed, and at the completion of the 14-week trial, fish were sampled for immune gene expression in the intestine and will be assessed for whole-body proximate composition. The feeding trial findings demonstrate the suitability of these ingredients in

largemouth bass diets, and these ingredients hold promise in fishmeal replacement for this fish species (Figure 2). Next, the team will histologically characterize overall changes to the gastrointestinal health and determine if any differences in susceptibility to columnaris disease occurs following the feeding of the soy-based diets. In bass production, *Flavobacterium* spp. and *Aeromonas* spp. are major bacterial pathogens of interest, and new avenues of control and prevention are also crucial to expanding the industry. The overarching objective of this project is to develop a cost-effective and sustainable direction for culturing largemouth bass with renewable resources through plant-based ingredients. Lowered production costs associated with plant-based diets will also open the door for the further expansion of largemouth bass aquaculture.

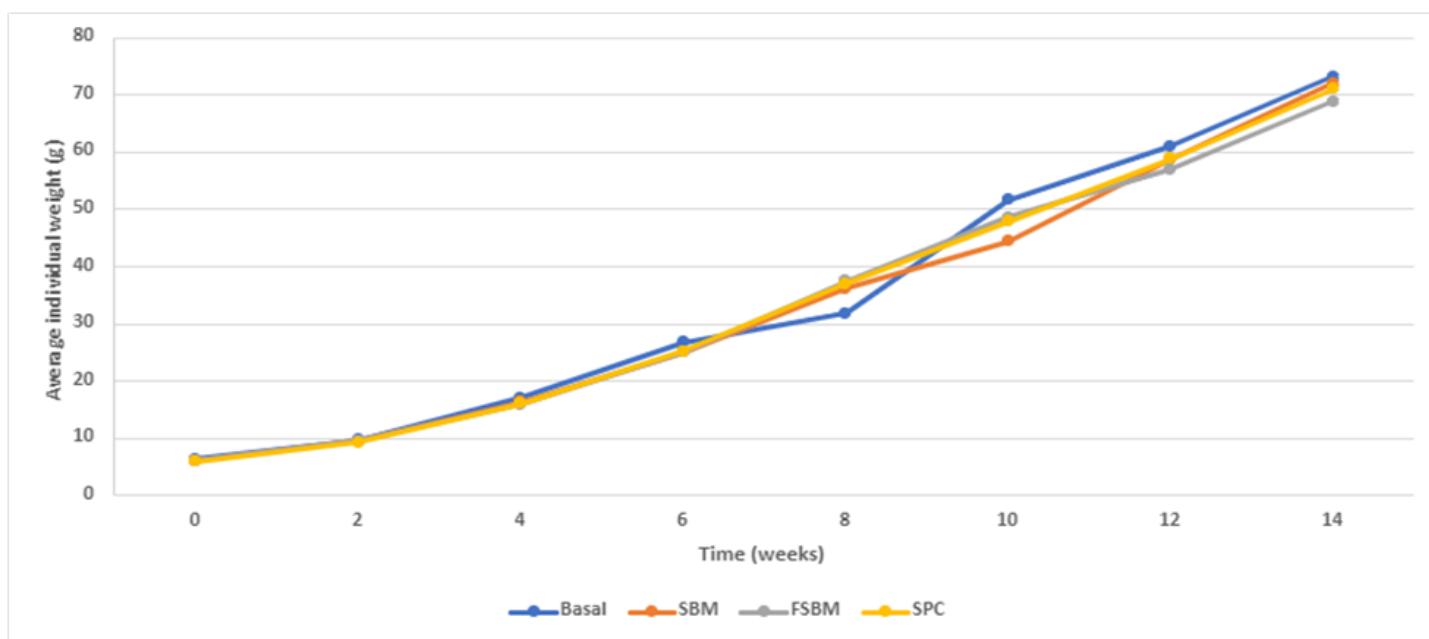


Figure 2. The average individual weight of largemouth bass fed soy protein diets throughout the 14-week feeding trial. Basal (Control diet), soybean meal (SBM), fermented soybean meal diet (FSBM), and soy protein concentrate diet (SPC).

Alabama Drought Reach: New Statewide Drought Outreach Program

Brianne Minton, Auburn University Water Resource Center

Drought in Alabama

Alabama is known for its hot summers, mild winters, and humid climate. Although the state receives on average 55 inches of rain a year, that precipitation varies throughout the year and across different regions of the state. This results in alternating periods of above normal rainfall and periods of drought. Data from the U.S. Drought Monitor (USDM), a federal product showing drought conditions in the U.S. since 2000, reveals that Alabama is no stranger to drought despite our large overall annual rainfall amounts. The USDM map displays the spatial extent

of farms span nearly 8.2 million acres, provide jobs to 600,000 Alabamians, and account for \$70 billion of the state's economy. Farmers impacted by drought can apply for federal relief funding through USDA if they fall within certain drought categories on the U.S. Drought Monitor Map. The Alabama Office of the State Climatologist is the state organization that provides Alabama drought input to the USDM.

New Statewide Drought Outreach Program

Auburn University's Water Resources Center (AUWRC) has partnered with the Alabama Office of the State Climatologist to create a new statewide drought outreach program called Alabama Drought Reach (ADR). ADR is dedicated to improving drought communication and statewide agricultural impact reporting and is working to protect producers impacted by drought (Image 1). This program is a joint effort between AUWRC, the Alabama Cooperative Extension System, and the Alabama Office of the State Climatologist with

U.S. Drought Monitor Label	Drought Conditions
D0	Abnormally Dry
D1	Moderate Drought
D2	Severe Drought
D3	Extreme Drought
D4	Exceptional Drought

Table 1. Five main categories of dryness and drought according to the U.S. Drought Monitor.

and severity of drought in five main categories (Table 1).

Over the past two decades, at least a quarter of the state has been dry (at least D0) 45% of the time. Similarly, at least a quarter of the state has been in a designated drought category (D1 or greater), 22% of the time (Figure 1).

These extreme dry conditions can occur rapidly (flash drought) or build up over an extended period of time (prolonged drought). Drought affects us all, but it has major impacts on our agricultural

community. Alabama's 38,000

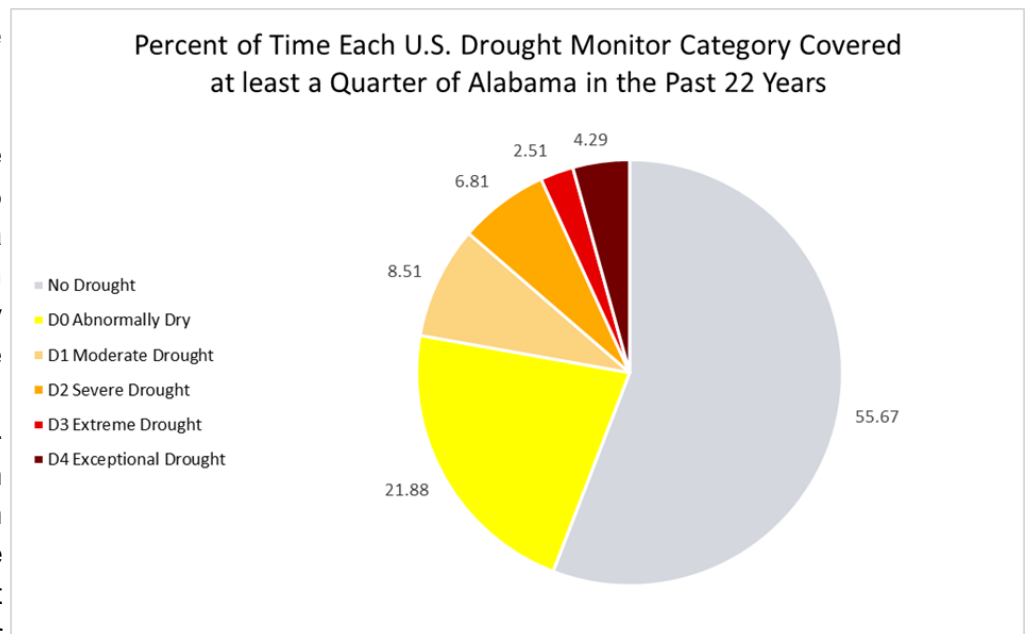


Figure 1. The percent of time that at least a quarter of Alabama has been in each drought category: Based on data from the U.S. Drought Monitor.



Image 1. Alabama Drought Reach (ADR) logo.

funding from the Alabama Agricultural Experiment Stations and USGS Water Resources Research Institute. The need for a statewide drought communication and monitoring program was born from the need to build a stronger relationship with Alabama Extension and the State Climate Office.

The State Climate Office provides input about drought severity across Alabama to the U.S. Drought Monitor Map. They use an array of data

and models to understand drought conditions across the state, but the office wants to improve their reporting through on-the-ground verification. By getting an exact location of drought impacts, the State Climate Office can create a more accurate drought map that better represents the impacts to producers. The role of Alabama Drought Reach, then, is to be the liaison between Alabama Extension agents, producers, and the State Climate Office. Brianne Minton (ADR Program Coordinator) works closely with Extension to better understand the drought severity and impacts seen in each county. She does this through weekly calls with regional agronomic crops and animal science agents and participation in statewide drought calls with the AL Office of Water Resources. Brianne has created an internal survey for Extension agents to report drought conditions to the State Climate Office, who then uses those reports to draw a more accurate map of drought severity in Alabama.

Why is Alabama Drought Reach Important?

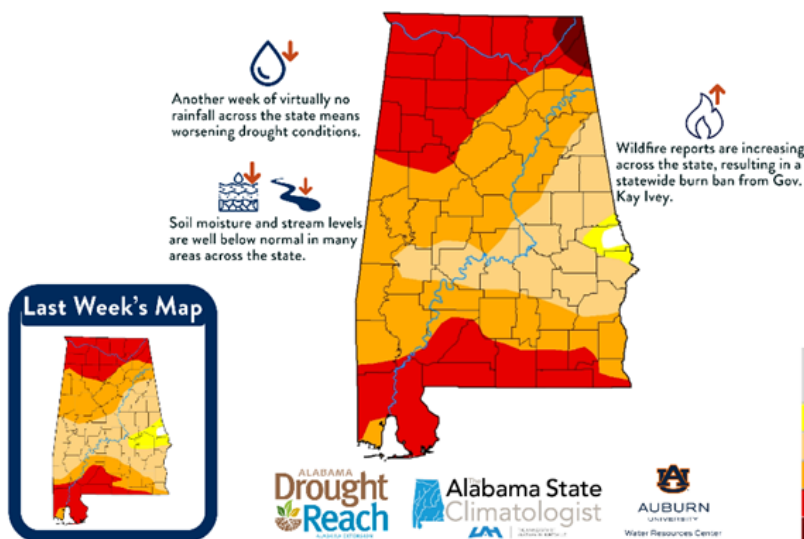
Alabama is no stranger to drought, and farms

Alabama Drought Update

For the assessment period ending **November 7, 2023**

This Week's Drought Monitor Map of Alabama

From the US Drought Monitor, authored by Lindsay Johnson (National Drought Mitigation Center) with input from the Alabama Office of the State Climatologist



Statewide Condition Summary

What's Changed? D4 (Exceptional Drought) was introduced for the first time this year in Jackson & DeKalb Counties. D3 (Extreme Drought) expanded down the western edge of the state and further into Southeastern Counties. Remaining drought conditions persisted from the previous week.

What's New? Drought conditions have now persisted long enough across the state that some farmers are eligible for USDA relief funding. Drought conditions are heavily impacting livestock and forestry. Winter wheat planting is delayed & some cattle producers are feeding supplemental hay. The increase in wildfires has resulted in Gov. Ivey enacting a statewide burn ban

What's Next? Predicted rainfall could relieve worsening conditions, but overall drought will persist.

Statewide Coverage by Category

Category	Coverage This Week	Changes Since Last Week
DO: Abnormally Dry	1.1%	3.2%
D1: Moderate Drought	19.9%	17.1%
D2: Severe Drought	41.1%	11.3%
D3: Extreme Drought	36.2%	7.5%
D4: Exceptional Drought	1.4%	1.4%

Image 2. Weekly Alabama Drought Update Graphic: Example from October 31, 2023.

that are negatively impacted by drought can apply for federal drought assistance through USDA Farm Service Agency (FSA). This assistance can provide relief for drought related damages to livestock, crops, and farmland. Aid for livestock and forages can be tied directly to Drought Monitor categories once a farm has been in D2 (Severe Drought) for eight weeks or D3 (Extreme Drought) or D4 (Exceptional Drought) for one week. USDA looks directly to the U.S. Drought Monitor map of Alabama to identify farms that have met these criteria, which means the State Climate Office works hard to make sure their drought maps are accurate and representative of all farms. This is why having location specific data is so important. It helps the State Climate Office verify and amend statewide drought designations.

How You Can Report Drought Near You

The best way you can help during times of drought is to report the impacts you are seeing so the State Climate Office can build a more accurate drought map. These can be direct impacts to your property or general dryness you are seeing in your

county. Examples of drought impacts include dried pastures, low stock ponds, parched lawns, and suffering crops. Report these conditions to Condition Monitoring Observer Reports (CMOR), a publicly accessible tool created by the National Drought Mitigation Center. These reports feed directly into the U.S. Drought Monitor map. Report now and report often. This is the best way to ensure your farm or property is accurately represented on the map.

Stay Up to Date on Alabama Drought Conditions

There are many ways to stay updated on statewide drought conditions. Follow Alabama Drought Reach on Twitter (@ALDroughtReach) to receive timely updates. Visit the ADR website to find archived drought and crop progress graphics (Images 2 and 3) and to find additional drought resources. Sign up for the Alabama Drought Reach newsletter, which will begin in 2024. If you have further questions about the program or how to get involved, please contact Brianne Minton at drought@auburn.edu.

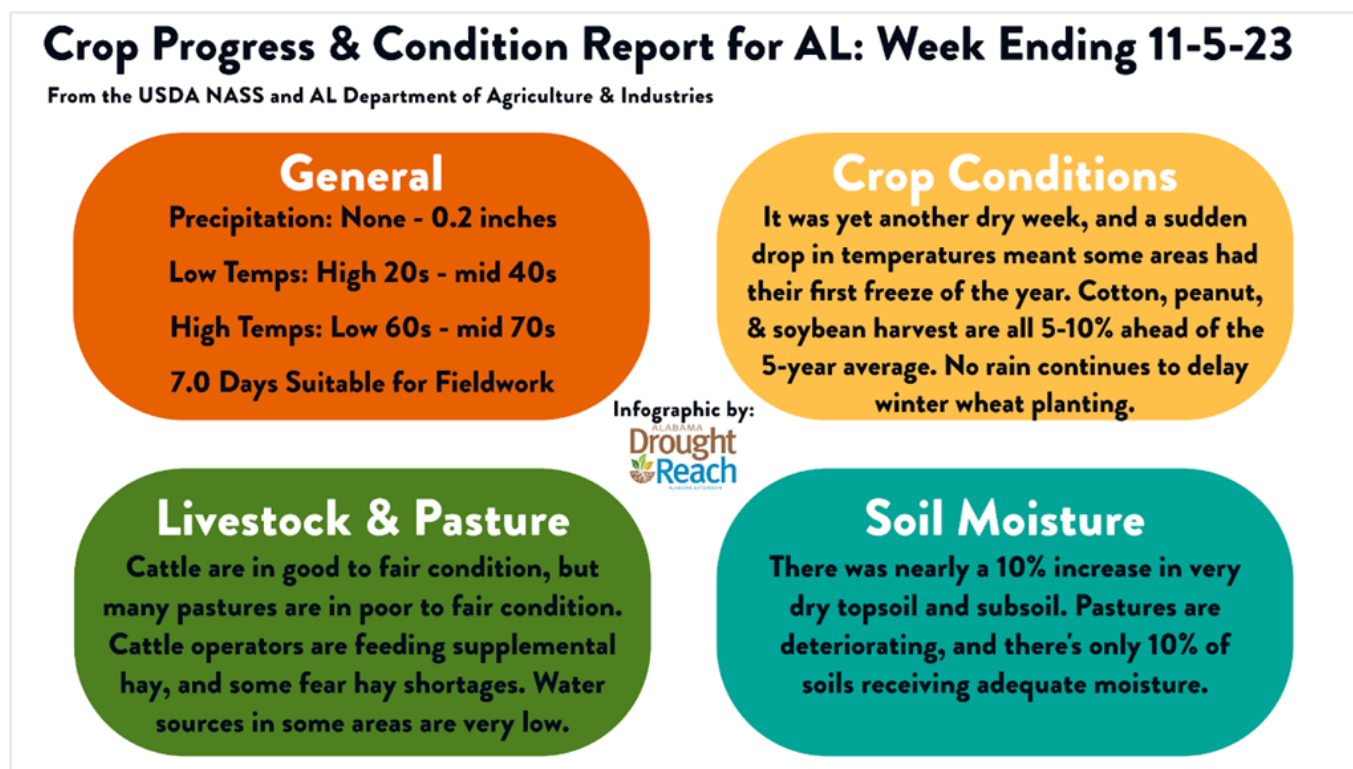


Image 3. Weekly Alabama Crop Progress Graphic: Example from October 31, 2023.

Managing Aquaculture Risk

Taryn Garlock, SFAAS

Risk is an important aspect of the farming business. Understanding risks, their severity, and how to manage them are critical for the financial success of aquaculture operations. Since eliminating all risk is not possible, the aim of producers should be to minimize the impact of risk on the financial stability of their operation. There are a number of ways to mitigate aquaculture risks, such as crop diversification, crop insurance, production contracts, and forward pricing, but each option has costs and benefits that should be considered against the risk itself. Below we discuss a few common types of risks related to aquaculture as well as some of the federal risk management programs available to Alabama aquaculture producers.

Types of aquaculture risk

Many types of risks associated with aquaculture are similar to those facing terrestrial agriculture: production risks, marketing risks, financial risks, among others. Some of the common types of production risks include disease, power outages or equipment failure, predation, and natural disasters. The impact of these risks can vary from catastrophic losses to less impactful reductions in growth and feed conversion ratios. The stage at which these risks occur within the production cycle will also influence its impact. Ultimately, each of these production risks can decrease the production of marketable products.

A second group of risks are associated with marketing. These risks include market volatility, instances where market prices are below the cost of production, as well as competition with alternative products. Marketing risks impact the prices received by producers and their resulting income.

Financial risk is related to the ability of an enterprise to pay its financial obligations and to maintain or grow its equity. Financial risks can be influenced by broader economic conditions, such as volatility in interest rates, changes in the market value of

loan collateral, and inflation. Financial risks can undermine the performance of an investment and debt repayment.

Federal risk management programs

The USDA Farm Service Agency (FSA) provides disaster assistance to aquaculture producers through the Emergency Assistance for Livestock, Honey Bees, and Farm-raised Fish Program (ELAP) and the Non-Insured Disaster Assistance Program (NAP). The USDA Risk Management Agency (RMA) provides subsidized insurance policies to help aquaculture producers manage risk. These programs are described in more detail below.

Emergency Assistance for Livestock, Honey Bees, and Farm-raised Fish Program (ELAP)

FSA provides disaster assistance to aquaculture producers raising food fish and other aquatic species for human consumption through the Emergency Assistance for Livestock, Honey Bees, and Farm-raised Fish Program (ELAP). Catfish and oyster aquaculture, two important sectors in Alabama, are eligible for disaster assistance. Losses, in excess of normal mortality, caused by adverse weather conditions, including flooding, freezing, tidal surge, tornadoes, excessive heat, excessive winds, and hurricanes, are covered. Payments for eligible loss events are based on a minimum of 75% of: the number of fish lost, in excess of normal mortality, multiplied by the state's average fair market value. Socially-disadvantaged, limited-resource, beginner and veteran farmers can qualify for 90% of the calculated payment. Feed that is lost or damaged due to adverse weather conditions is also covered, and payments are a minimum of 60% of the actual cost of purchased feed. Records, such as loan and insurance records, property taxes, sales invoices or receipts, may be required to prove an eligible loss event and to document beginning and ending inventories, so maintaining good farm records is im-

portant.

Producers with an average adjusted gross income greater than \$900,000 are not eligible for the program. Acreage reports must be completed at your local FSA office each year by September 30 to participate in the program. To find your county office, go to <https://www.fsa.usda.gov/state-offices/Alabama/index>. In addition to filing annual acreage reports, a notice of loss must be filed within 30 days of when the mortality event becomes apparent, and an application for payment must be submitted no later than 30 days after the end of the calendar year (January 30). See the USDA ELAP Fact Sheet and contact your local FSA office for more information.

Non-Insured Disaster Assistance Program (NAP)

A second FSA program, the Non-Insured Disaster Assistance Program (NAP), safeguards producers against natural disasters that result in low yields, loss of inventory, or the inability to stock. Eligible causes of loss include hurricanes, drought, freezes, tornadoes, among others. NAP offers basic and buy-up coverage. Basic NAP coverage provides catastrophic coverage for losses in excess of 50% of the inventory and at 55% of the established FSA market price. The payment is limited to \$125,000 per crop year per individual. The service fee for basic coverage is \$325 per crop per county, which can be waived for socially-disadvantaged, limited-resource, beginner and veteran farmers. Higher coverage can be purchased from 50 to 65 percent of inventory at 100% of the established price, and payments to producers are limited to \$300,000 per crop per year. The option to buy-up has a premium in addition to the service fee.

Acreage reports must be filed by September 30, and monthly inventory reports are required under NAP. A notice of loss form must be completed within 15 days of the date that the damage becomes apparent, and producers of hand-harvested crops must also notify FSA within 72 hours of when the loss becomes apparent. Producers of hand-harvested crops must also notify FSA within 72 hours of when the loss becomes apparent. Producers can receive benefits from both ELAP and NAP for eligible losses. Producers with an average adjusted gross income greater than \$900,000 are not eligible for the NAP program. More information on NAP can be found on the USDA

Fact Sheet and by visiting your local FSA office.

Whole-farm Revenue Protection

Crop insurance programs are intended to transfer risk from aquaculture producers to the insurance company. Insurance programs are commonly used in terrestrial agriculture, but less common in aquaculture. The USDA Risk Management Agency has a revenue-based insurance policy available for purchase by aquaculture producers in Alabama. Whole-Farm Revenue Protection (WFRP) is a policy that can protect a farm from lost revenue associated with unavoidable natural causes. This is an umbrella program that insures all commodities on the farm under one insurance policy up to \$17 million in insured revenue and is best suited for diverse farms that produce multiple commodities.

Coverage levels are available between 50 and 75 percent, and higher coverage is available if three or more commodities are produced. The premiums are based on insured revenue, coverage level, and the number of commodities. The producer must be able to provide revenue history by submitting five consecutive years of tax forms, or three years if they qualify as a beginning farmer, as well as farm plans and inventory reports. Payments under this program are made after the producer files their taxes, and only if the farm's revenue-to-count falls below the insured amount of revenue. More information on the WFRP can be found on the USDA Fact Sheet. Federal insurance policies are sold by private crop insurance agents. Visit the USDA Risk Management Agency website to locate an insurance agent.

Shellfish Crop Insurance Pilot Program

A second crop insurance program is now available to Alabama shellfish producers in Baldwin and Mobile counties. The new Shellfish Crop Insurance Pilot program is an actual production history-price component (APH-PC) coverage policy for container-grown oysters commercially cultivated for the fresh half shell market. The program provides protection against losses due to named storms, excessive heat and freezes during low tide events, and low salinity due to excessive rainfall. This new program will be available beginning with the 2024 crop year.

The producer is able to select the percentage of their yield to cover between 50 and 75%, and the percentage of the crop price to cover between 55% and 100%. The production guarantee is based on the producer's expected harvest for the crop year which is determined by historical survival rates and seed purchases from the producer's records. Expected production is capped at 125% of historical oysters harvested. Producers can purchase additional coverage to insure a higher price based on their personal sales records.

The program requires a minimum of four years of records, and the program will only cover seed purchases above a seed size of 4 millimeters. Producers can participate in this program and NAP, but they can only obtain benefits from one program. Producers can receive benefits from this program and ELAP during the same insured year. Oyster producers have until November 30 to purchase this policy. Federal insurance policies are sold by private crop insurance agents. Learn more about the program by visiting Shellfish | RMA (usda.gov) or visit the USDA Risk Management Agency website to locate an insurance agent.

Winter Kill in Largemouth Bass

Anita M. Kelly, AFFC

The term winter kill has two different meanings. The first is the massive fish die-off that occurs in an ice and snow-covered pond and is usually the result of low dissolved oxygen or oxygen depletion. The second meaning of winter kill refers to a water mold called saprolegniasis. Many refer to this disease as a fungus, but it is not. As water temperatures decrease, the immune system in largemouth bass becomes suppressed, meaning it is not as quick to respond to infections. Additionally, saprolegnia is more active at lower water temperatures. Since the disease occurs in colder water temperatures, it is called winter kill. This disease usually occurs in Alabama when water temperatures are below 59 °F, often after a cold front has rapidly dropped the water temperature. In some cases, high ammonia concentrations in the water or exposure to some environmental stressors in the prior summer or fall can cause this disease.

Winter kill starts with cotton-like patches on the head and fins and spreads as patches over the body, including the gills (Fig. 1). It is not unusual for large lesions to appear suddenly within 24 hours. Although this disease spreads rapidly over the surface of the fish, it rarely penetrates beyond the muscle layer just

under the skin. The superficial damage to the skin and gills can be fatal to the fish. As the amount of affected skin or gill tissue increases, so does the mortality rate.

Unfortunately, water molds are very difficult to treat. The most economical treatment method is using management strategies to prevent winter kill. Maintaining good water quality and controlling stress and skin damage to the fish will decrease the chance of an outbreak of winter kill during the cold months.

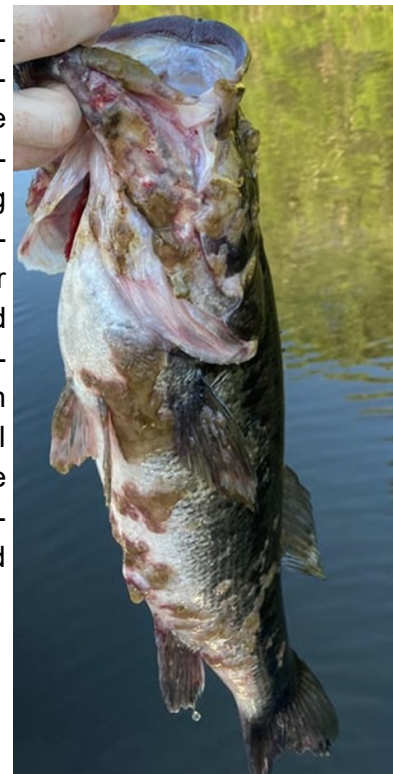


Figure 1. Largemouth bass with winter kill.

RESEARCH ROUNDUP

How Many Catfish Could a Cormorant Catch if a Cormorant Could Catch Catfish?

Sarah Knutson, MS Graduate Research Assistant, College of Forestry, Wildlife and Environment, Auburn University

As we know, double-crested cormorants can and do catch catfish, with losses due to cormorant predation in the Mississippi Delta region estimated at \$5.6-12 million annually. Most of this loss occurs from January to April which coincides with peak numbers of migratory cormorants on ponds. While the Mississippi Delta farms experience high incidences of cormorant depredation due to being more directly in the middle of the Mississippi Flyway, which cormorants use during migration, farms in the Black Belt region of Mississippi and Alabama also experience heavy losses. Most depredation studies have occurred in the Mississippi Delta region, leading to a well-understood impact of cormorants on the fish and finances of farms in this area; however, the same cannot be said for farms within the Black Belt region. The USDA NIFA Southern Regional Aquaculture Center has funded a two-year research project to assess the foraging patterns and rate of fish consumption of cormorants in the region with the goal of quantifying their economic impact. The outcomes of this research will provide an estimate of economic losses due to depredation, which can inform policies and management strategies to mitigate losses for this underrepresented region.

Sarah Knutson, a MS graduate research assistant in the College of Forestry, Wildlife and Environment at Auburn University under the direction of Dr. Mark Smith, will be spearheading data collection for the next two years. Additional cooperators on this research project include Alabama Fish Farming Center personnel (Drs. Luke Roy and Anita Kelly) along with research scientists from the USDA Wildlife Ser-

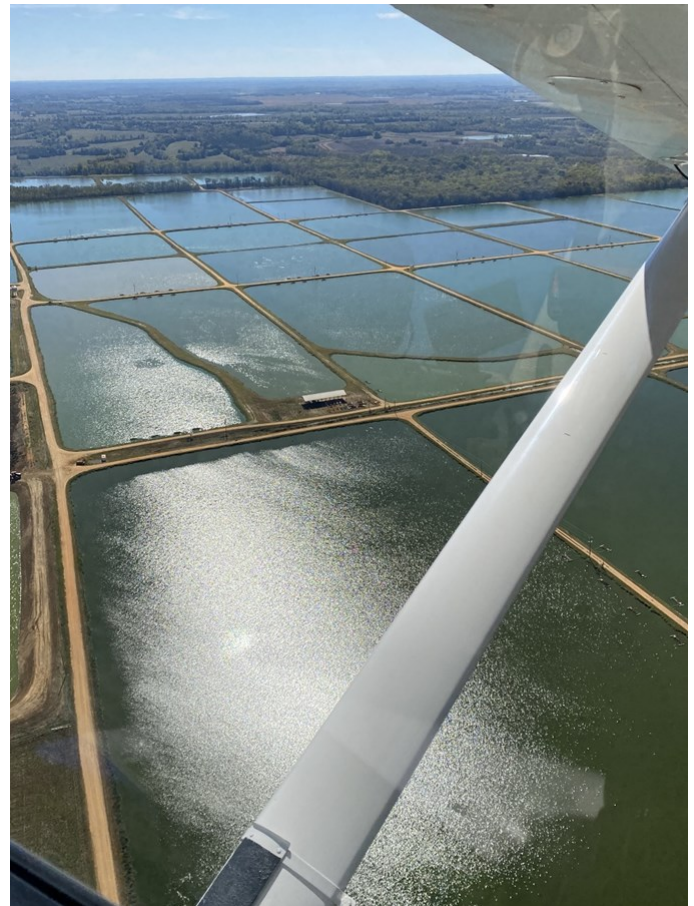


Figure 1. Aerial survey of one of the randomly selected farms surveyed on November 2, 2023. Photo Credit: Sarah Knutson, Graduate Student, Auburn University.

vice's National Wildlife Research Center in Starkville, MS (Drs. Brian Dorr and Paul Burr) with economic valuation support from Drs. Carole Engle and Jonathan van Senten of the Virginia Seafood Agriculture and Experiment Station. The Mississippi, Alabama, and Tennessee Offices of USDA Wildlife Services are providing additional support.

Presently, aerial surveys of randomly selected farms within the region are underway to inform locations for cormorant collection. These survey flights will be conducted every two weeks between November 2023 and April 2024 and again October 2024 to April 2025, following peak cormorant occupancy. After each survey, the research team will collect cormorants from a random subset of farms that had cormorants present at the time of the survey. Analysis of prey items (weight and frequency of occurrence) within the stomachs will be conducted once back at the lab. From these observations, cormorant abundance and distribution data will be combined with the proportion of collected birds that consumed catfish to estimate overall quantities of catfish consumed given a set of pond characteristics such as size and current production type and species produced. This information will then be sent to Drs. Carole Engle and Jonathan van Senten so they can develop enterprise

budgets to estimate the total financial loss experienced by catfish producers in eastern Mississippi and western Alabama. Separate budgets will be developed for hybrid and channel catfish production, split pond production of hybrid catfish, and intensively aerated ponds in the study area. The resulting yield values in the analysis will reflect scenarios with and without losses from bird predation. For each farm size/production practice scenario, breakeven price above total costs with and without predation losses, breakeven yields, relative proportion of variable and fixed costs, income above variable costs, and net returns will all be compared. The economic analyses developed will provide a comprehensive view of the economic effects on various sizes of catfish farms using different production systems. Additionally, increased costs to scare birds, revenue lost from fish consumed by cormorants, and yield reductions from bird depredation will be included.

Blackbird Depredation Impact on Arkansas Baitfish and Sportfish Aquaculture

Madeline Redd, MS Graduate Research Assistant, SFAAS

Southern Regional Aquaculture Center funding was secured to investigate the impact blackbirds species have on Arkansas baitfish and sportfish production. According to the 2018 USDA census report, the Arkansas baitfish and sportfish industry produced ~\$36 million dollars in sales with Lonoke and Prairie counties contributing 72% of the state's total baitfish and sportfish production. However, in 2020 aquaculture economist Dr. Carole Engle conducted a preliminary survey of baitfish and sportfish farmers and found that 92% of farmers who responded were experiencing blackbird depredation issues with Common grackles (*Quiscalus quiscula*; grackles), Red-winged Blackbirds (*Agelaius phoeniceus*), Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*), and Brown-headed Cowbird (*Molothrus ater*). To fur-

ther understand and quantify the magnitude of the impact of these predatory birds to production, a multi-disciplinary team of researchers from the Alabama Fish Farming Center (Drs. Luke Roy and Anita Kelly) and the College of Forestry, Wildlife and Environment (Dr. Mark Smith) along with research scientists from the USDA Wildlife Service's National Wildlife Research Center in Starkville, MS (Drs. Brian Dorr and Paul Burr) with economic valuation support from Drs. Carole Engle and Jonathan van Senten of the Virginia Seafood Agriculture and Experiment Station were assembled. Additional support is being provided by the Arkansas Office of USDA Wildlife Services. Madeline Redd, a MS graduate research assistant at Auburn University, will be spearheading this research under the direction of Drs. Mark Smith and

Luke Roy.

For this study, grackles will be the focus due to previous studies that found the grackle diet showed a peak of fish consumption during their nesting season, March through July. This time frame aligns with 58% of surveyed farmers who reported blackbird depredation issues. Baitfish producers of golden shiners (*Notemigonus crysoleucas*) tended to report blackbird problems beginning in March whereas sportfish producers of sunfish (*Lepomis* spp.), Large-mouth Bass (*Micropterus salmoides*), and Hybrid Striped Bass (*Morone* spp.) reported problems beginning in May or June. The varying survey results could be related to the spawning time differences among fish species.

USDA Wildlife Operations team (Arkansas) and National Wildlife Research Center (Mississippi Field Office) staff conducted preliminary research in April and May 2023 (Fig. 1 & Fig. 2). The goal of the preliminary research was to investigate grackle gizzards for fish hard parts and other identifiable items. Overall, thirty-two grackles were collected from sheds and ponds. Seven of the thirty-two birds (23%) showed the presence of fish hard parts. Five were collected off brooder ponds, and two were collected from under fish holding sheds, indicating that grackles con-

sume fish off ponds and sheds. Although sheds were covered based on farm requirements, in most cases it did not deter grackles from foraging in the relatively shallow vats with a high fish density. Baitfish farmers expressed that grackles target broodstock ponds, primarily seen on the levees and spawning mats. Spawning mats are placed along the edge of ponds and used by spawning baitfish, which allows for grackles to utilize these mats for feeding on baitfish and eggs.

Research will begin in mid-March through July 2024 and will be repeated again in 2025. Approximately twelve farms will be selected in Lonoke and Prairie counties, Arkansas, from which the research team will conduct shed and pond surveys to determine the relative abundance of predator birds and the frequency in which they prey upon baitfish and sportfish. Additionally, a sample of these predatory birds will be collected to determine the number of fish consumed. For the selected sportfish farms, only shed surveys will be conducted. The ultimate goal of this study is to generate estimates of the economic loss of baitfish and sportfish to predatory birds, which can subsequently be used to inform the development of management policy strategies to mitigate losses.



Figure 1. Grackle collections occurred in Arkansas in 2023.



Figure 2. A grackle at a commercial farm in Arkansas.

Use of high protein distiller's dried grain with yeast in practical diets for the channel catfish, *Ictalurus punctatus*

Sidra Nazeer^{1,2}, Darci Carlos Fornari¹, Harsha S.C. Galkanda-Arachchige^{1,3}, Scott Tilton⁴, D. Allen Davis¹

¹SFAAS, ²Fisheries Research and Training Institute, Manawan, Lahore, Pakistan

³Wayamba University of Sri Lanka, Makandura, Gonawila, Sri Lanka

⁴The Andersons, Maumee, OH, USA

In catfish feeds, plant-based proteins have increased as they are of reliable quality and easily accessible globally. The use of plant-based proteins in aquaculture feeds dictates the presence of unique nutritional attributes of its composition, such as low levels of fiber and anti-nutritional compounds. These products should incorporate a comparatively high protein content, balanced amino acid profile, reasonable price, acceptable palatability, suitable supply, and high nutrient digestibility.

Distillers dried grains with solubles (DDGS), a co-product of the dry-mill ethanol industry, are the dried residue that remains after the fermentation of corn mash (or other grains) by selected yeasts and enzymes to produce ethanol and carbon dioxide. One of the more recent products is a high-protein distiller dried grain and lipid extracted DDGS. The high-protein 42 distillers dried grains with yeast (HP40Y) manufactured by The Andersons (Maumee, OH) were processed under modified technology by separating corn fiber before fermentation and removing the soluble fraction after fermentation to produce a high-quality combination of corn and yeast proteins. The HP40Y product is higher in protein 41–43% than traditional DDGS (27–30%). This study was carried out to investigate HP40Y as a replacement for soybean meal and poultry meal in practical diets of juvenile channel catfish.

As the ethanol industry matures and adopts new technologies, co-products are also changing to meet feed industry needs. High protein distillers dried grain with yeast (HP40Y) is a variant of distillers



Figure 1. High Protein distillers dried grains with yeast.

dried grains that could be used as an improved protein source in catfish feed formulations. To evaluate the efficacy of HP40Y, a 10-week trial was conducted to evaluate the growth performance of juvenile catfish, *Ictalurus punctatus* (mean initial weight 1.80 ± 0.05g).

In the trial, graded levels of HP40Y (0.00, 3.10, 6.20, and 9.30%) were used to replace poultry meal (6.0, 4.0, 2.0 and 0.0%) and another series of diets were used with HP40Y (5.0, 10.0, 15.0, 20.0, 30.0 and 40.0% inclusion) to replace soybean meal (51.00, 46.49, 41.90, 37.40, 28.20, 19.20% inclusion). In the poultry meal replacement series, complete replacement of poultry meal with HP40Y in diet PDG9 resulted in poor performance, indicating a possible nutritional deficiency when the animal protein was removed. As a replacement for soybean

Diets	HP40Y level (%)	Final weight (lb)	Weight gain (%)	FCR	Survival (%)	NPR (%)
Basal	0.00	0.054a	1214.66a	1.09c	98.75	42.85a
PDG3	3.10	0.043ab	1168.83a	1.14bc	100	40.43ab
PDG6	6.20	0.046b	1103.25a	1.20ab	96.25	38.47ab
PDG9	9.30	0.031c	881.92b	1.27a	97.5	33.90b
PSE		1.28	82.6	0.04	3.06	3.71
p-value		0.00	0.00	0.00	0.38	0.03
SDG5	5.00	0.052a	1277.36a	1.06c	100	42.11ab
SDG10	10.00	0.055a	1262.93a	1.07c	100	44.82a
SDG15	15.00	0.056a	1348.62a	1.05c	98.75	43.78a
SDG20	20.00	0.057a	1340.35a	1.06c	100	43.65a
SDG30	30.00	0.044b	1019.81b	1.27b	100	35.26b
SDG40	40.00	0.026c	612.99c	1.68a	100	24.39c
PSE		0.83	62.9	0.03	1.72	3.15
p-value		0.00	0.00	0.00	0.30	0.00
ANCOVA						
Model		<0.0001	<0.0001	<0.0001	0.31	<0.0001
Base		0.78	0.55	0.81	0.73	0.67
Inclusion level		<0.0001	<0.0001	<0.0001	0.12	<0.0001
Interaction		<0.0001	<0.0001	<0.0001	0.41	<0.0001
(Base*Inclusion)						

Table 1. Response of juvenile catfish (mean initial weight 1.80 ±0.05g) fed diets containing different levels of HP40Y to replace PM or SBM over a 10-week experimental period. Values represented the mean of four replicates.

PDG= Poultry based distiller grains diet series
SDG= Soybean based distiller grains diet series

meal, increasing levels of HP40Y only resulted in reduced catfish growth when included in the diet at 30 and 40%. The reduced performance at higher levels may be due to marginal levels of an essential

amino acid (e.g., lysine). Results of this initial study indicate that HP40Y has potential as a protein source when used at levels less than 30% of the diet in channel catfish. The present study's findings suggested that HP40Y is a good plant protein source and can be supplemented in catfish diets up to 20% to replace soybean meal without compromising growth. In addition, the HP40Y product also contains an elevated level of yeast, stimulating growth.

Due to new developments and technological advancements, certain ethanol plants are modifying their processing. This high-protein 42 distillers dried grain with yeast (HP40Y) is a new product from the latest technology using specialized Sedi canterers to remove maximum solids from the stillage to produce a high-quality product. It has 12-18% yeast in it, which could be very helpful in stimulating the immune system of fish as well. This product is not only used in catfish diets but also in a range of fish and shrimp species. Studies have demonstrated that the use of HP40Y and other similar products are good protein sources for a range of aquaculture species providing another option for commercial feeds.

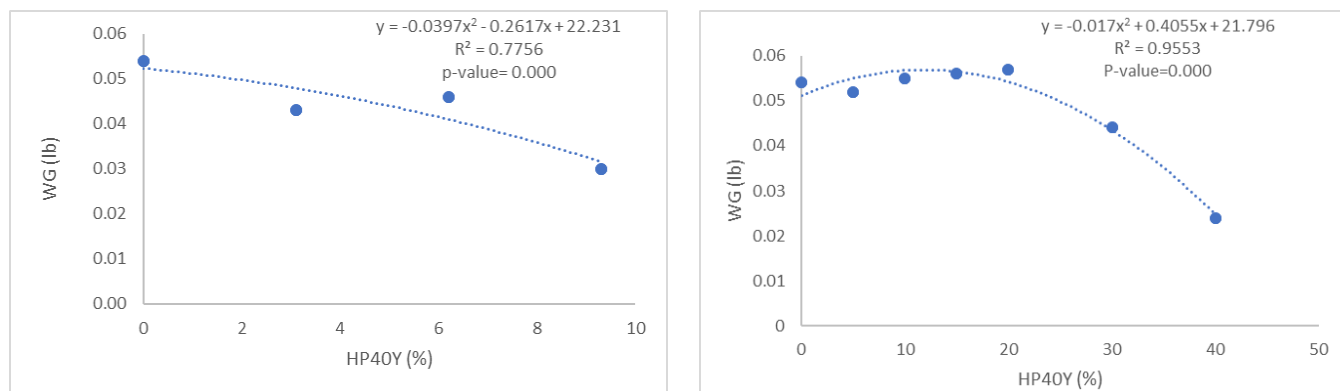


Figure 2. Relationship between weight gain (WG %) and the inclusion level of high protein dried distillers' grains (HP40Y) in the diets replacing poultry meal (left figure) and soybean meal (right figure).

Cajun Catfish Sheet Pan Dinner

- 2 U.S. Farm-Raised Catfish fillets
- 1 1/2 cups new potatoes
- 1 cup Brussels sprouts, halved
- 1 ear yellow corn, cut in half then quartered
- Olive oil
- Cajun seasoning
- 3 whole garlic bulbs, tops removed
- 4 large shrimp
- 1 lemon, sliced



- Preheat oven to 350° F. Line a sheet tray with parchment paper.
- Combine potatoes, brussels sprouts and corn. Drizzle with oil, and toss to coat. Season with Cajun seasoning blend.
- Place on parchment paper, leaving room in the middle for catfish. Add garlic, and drizzle tops with a little oil. Bake for 20 minutes.
- Prepare catfish and shrimp by drizzling with oil and season with Cajun seasoning.
- Remove from oven. Add catfish, shrimp and lemon slices to pan.
- Bake for an additional 15 minutes or until catfish is golden and flakes easily.

Recipe and photo from The Catfish Institute

Jaky J. Broussard

Accountant II

jjb0033@auburn.edu

Sunni L. Dahl

Research Assistant III

sld0036@auburn.edu

Jesse B. James

Research Associate I

jbj0023@auburn.edu

Anita M. Kelly

Extension Professor

amk0105@auburn.edu

Luke A. Roy

Extension Professor

Assistant School Director of AFFC Operations

royluke@auburn.edu

James Tuttle

Graduate Research Assistant

jtt0039@auburn.edu

Alabama Fish Farming Center

529 South Centreville Street

Greensboro, AL 36744

334-624-4016



AUBURN UNIVERSITY®

SCHOOL OF FISHERIES, AQUACULTURE
AND AQUATIC SCIENCES



Luke A. Roy & Anita M. Kelly, Technical Editors
Jaky J. Broussard, Layout Editor

Fish Farming News, 2023(2):1-16