One of the crucial elements in a fish farm is the hatchery, where eggs are fertilized and incubated until they hatch into fry. This process is vital for producing healthy fingerlings that can be sold or transferred to grow-out ponds. Most commercial fish farms rely on hatcheries due to their efficiency in increasing survival rates and allowing farmers to control genetic makeup. Catfish hatcheries employ various methods, including egg incubation and fry rearing, to produce fingerlings. The process begins with collecting eggs from adult female catfish, followed by fertilization and incubation. After hatching, the larvae are raised until they reach a suitable size for transfer to grow-out ponds. Successful catfish hatchery operations require careful management of factors such as water quality, feeding, and disease management. The construction of a hatchery is essential for farmers looking to produce a consistent supply of high-quality fingerlings (juvenile catfish). These fingerlings are crucial for pond stocking and ensure that farmers have access to a reliable source of fish that meets their specific requirements. Another significant benefit of a hatchery is its ability to allow farmers to control the genetic quality of their stock. By selectively breeding fish in a controlled environment, farmers can produce better-adapted fish that are more resistant to disease, ultimately leading to improved overall catfish stock quality and higher yields. A review of on-farm feed management practices for North African catfish (Clarias gariepinus) in sub-Saharan Africa was conducted by Thomas Hecht, highlighting the increasing trend of catfish production in Uganda and Nigeria. The study found that semi-intensive pond culture is still prevalent, while intensive tank culture is becoming more popular in peri-urban areas. The review also touched on hatchery practices, including the importance of adequate fertilization schedules for successful larval rearing. Moreover, a report on the Western Cape Province State of Biodiversity 2007 was published, featuring a comprehensive overview of the region's aquatic life, including freshwater fishes, amphibians, reptiles, mammals, avifauna, flora & vegetation, and land and protected areas. The report highlighted the importance of preserving biodiversity in the face of rapid destruction. Human activities are causing widespread destruction of natural habitats and driving species to extinction. As populations shrink, genetic variation is being lost, and unique subspecies are disappearing. The main culprit behind this loss of biodiversity is human activity, which alters and destroys natural habitats to meet our needs (Primack, 2002). To address this issue, CapeNature launched the State of Biodiversity Programme in 1999 to monitor the state of biodiversity in the Western Cape. Their reports, updated every five years, provide valuable insights into the changes occurring in vertebrate biodiversity and land conservation usage. However, despite these efforts, pollution remains a significant threat to aquatic ecosystems worldwide. The African Sharptooth catfish (Clarias gariepinus) is particularly vulnerable to environmental pollutants, making it an important species for monitoring water quality. This fish has a wide distribution and could serve as a valuable bioindicator of pollution in various freshwater ecosystems. To use C. gariepinus effectively as a bioindicator, researchers must establish its baseline clinical chemistry parameters. A recent study aimed to define the clinical chemistry parameters of C. gariepinus. The results showed that this fish has low plasma protein values, particularly low albumin levels, which are comparable to those found in Channel catfish (Ictalurus punctatus). However, the plasma urea and creatinine levels in C. gariepinus were significantly lower than in dogs and Channel catfish. These findings have important implications for using C. gariepinus as a bioindicator of pollution in aquatic ecosystems. Practices: Profile VII. References a. Historical Background * African catfish have been part of traditional capture-based aquaculture for centuries. * Modern culture of North African catfish Clarias gariepinus began with domestication trials in the 1950s and widespread adoption by the mid-1970s. b. Related Links c. Main Producer Countries III. Production a. Production Cycle b. Production Systems c. Diseases And Control Measures IV. Statistics a. Production Statistics b. Market And Trade Clarias gariepinus Burchell, 1822 [Clariidae] FAO Names: En - North African catfish, Fr - Poisson-chat nord-africain, Es - Pez-gato Biological features: * Body elongate. * Head large, depressed and bony with small eyes. * Narrow and angular occipital process; gill openings wide; air-breathing labyrinthic organ arising from gill arches. * First gill arch with 24 to 110 gillrakers; cleithrum pointed, narrow with longitudinal ridges and with sharpness. * Mouth terminal, large. Four pairs of barbels present. * Long dorsal and anal fins; without dorsal fin spine and adipose fin. * Anterior edge of pectoral spine serrated. * Caudal fin rounded. * Colour varies from sandy-yellow through gray to olive with dark greenish-brown markings, belly white. View FAO FishFinder Species fact sheet Images gallery FAO Fisheries and Aquaculture Department 2.5 kg Clarias gariepinus Nursing semi-intensive pond Clarias fry nursing tank Clarias intensive nursing (Photo: John Moehl) Clarias intensive farming Clarias harvest in Cameroon Using a protocol, genomic DNA was extracted from the fins of 20 Nile crocodile samples from each population. Seven primers amplified different loci on the extracted DNA by PCR and the fragments were analyzed on an agarose gel. In another study, healthy and sick crocodiles were examined from three rivers in the Kruger National Park to determine chemical parameters in their blood and metal content in organs like fat, muscle, kidney, and liver. The results of the blood analyses were similar to those found in literature, but the metal analyses were inconclusive due to lack of comparable data. Propagating catfish: a study on novel techniques for sperm collection. This research employed surgical methods for partial testicular resection in male catfish in vivo, along with a new method of urine descent prior to sperm selection. General anaesthesia was achieved through immersion of the fish in a tank containing 25 L water and clove oil at a dose of 0.04 mL L-1. A small incision (5-8 cm) was sufficient for testicular ablation. For the first time, separate sutures were applied to the peritoneum and skin to create additional anastomoses holding internal organs in place. Testicular regeneration was observed. As an alternative to surgical methods, catheterization of the urine bladder before sperm collection was used. These techniques aim to keep male catfish alive while obtaining high-quality milt without contamination by urine. The methods of partial gonadectomy and urinary bladder catheterization can be applied in farming and conservation aquaculture for European catfish and other silurids. Given article text here The African catfish Clarias gariepinus has high disease resistance, but its genomic information is scarce. To understand its immune response to pathogens at a molecular level, researchers challenged the fish with Aeromonas veronii and used RNA-seq technology. The study found 2482 differentially expressed genes (DEGs), including 114 immune-related genes, which were significantly enriched in pathways related to immune response. The 114 DEGs displayed four expression patterns by cluster analysis and were enriched in 38 pathways, including NF-kappa B, TNF, NLR, TLR, and RLR pathways. The study aimed to better understand the fish's immune response to infection at a molecular level, but it does not provide further details on the research findings or their implications for aquaculture. The shelf life of farmed hybrid catfish was investigated by analyzing changes in chemical compounds during a 15-day refrigerated storage period. The results showed that certain peptides, fatty acids, and nitrogen-based compounds increased over time, while earthy odor-causing geosmin and 2-MIB levels exceeded their thresholds. This could be attributed to the masking effect of other off-odors. In contrast, environmental requirements for African catfish hatchery rearing were examined in a separate study. The research focused on temperature preferences, light effects on behavior and growth, salinity impacts on larval development, tank hygiene, and density influences on growth. Additionally, tips were provided for managing ponds to rear fry into fingerlings, including the importance of collecting spawns from ponds and splitting resulting fry at commercial hatcheries. It was noted that in some regions, catfish spawning may begin as early as April. As temperatures fluctuate throughout the spawning season, producers must adjust their check intervals for eggs in the brood pond. Cooler water slows egg development, allowing for less frequent checks every 4-5 days. However, a sudden drop in temperature can lead to fungal outbreaks and abandoned eggs, necessitating more frequent inspections when water temperatures plummet. Many producers wait until temperatures remain above 70°F (21°C) for three consecutive nights before releasing spawning cans. As the season advances, younger fish tend to spawn later than their larger counterparts. As temperatures rise, egg development accelerates, requiring more frequent checks every 3 days. Warmer water reduces fungal risks but increases bacterial infections and the likelihood of channel catfish virus transmission from brood fish to eggs. When collecting egg masses, a laundry basket with floats is preferred over a washtub or bucket for improved water circulation. During transport, eggs should be kept in water from the brood pond with adequate aeration, using an airstone supplied with compressed oxygen. At the hatchery, eggs undergo an iodine bath for 5-10 minutes following label directions, after which they should not be removed without an iodine treatment. Large temperature fluctuations are avoided by mixing transport and hatchery water for the initial dip. As the iodine solution loses its color, it's replaced, and large egg masses are divided in the iodine bath if necessary. Egg masses of similar ages are hatched together, while newly laid eggs aren't placed with advanced masses unless space is scarce. Large egg masses are broken into manageable pieces during the initial dip to prevent overcrowding. Dissolved oxygen levels remain at 5 mg/L, and hatching temperatures range from 77°F (25°C) to 82°F (28°C), as temperatures outside this range can lead to fungal or bacterial issues. In early season, hot water heaters can be used to warm the water, but high temperatures can slow development and occupy too much hatchery space. Hatching water hardness Water hardness levels should be kept at or above 50 mg/L, as advised by some experts and the Cooperative Extension Service. County agents can assist in setting up a system to add calcium chloride to hatchery water when necessary. Daily inspections are crucial, involving fungal or bacterial removal, debris elimination, and regular egg mass turning for uniform aeration. Iodine solution dips should be done daily, except one to two days before hatching, to prevent infections. Troughs with too great an age difference between spawns require separate cleaning and management to avoid bacterial infection. To simplify work, similar-age eggs should be grouped together in hatching troughs. When using pond water, reserve some troughs for hatching and maintain a recirculating water source or frequent cleaning to prevent sediment buildup. After hatching, sac fry are collected and counted, with no more than 2-3 inches deep in containers. Up to 300,000 sac fry can be produced at once in a hatching trough. Fry from one trough can be placed together for up to three days before splitting into additional rearing troughs or moving to fingerling ponds. Post-hatching cleaning involves draining, scrubbing, disinfecting, and rinsing the trough thoroughly, as well as sanitizing aerators, standpipes, screens, and airstones with bleach. Siphon tubes and collection materials should be disinfected with iodine solution while avoiding contamination of nearby troughs. Maintaining good hygiene significantly boosts fry survival rates and yields substantial harvest benefits. The more space available for fry to grow without overcrowding, the better. If limited space exists, some fry can be moved out early, while others stay for added growth before being placed in a separate fingerling pond. Early-moving fry may be sent to a different location for an earlier source of fish for stocking purposes. Stocking fry into staked net pens, also known as "hapas," for the initial week in fingerling ponds enables easier feeding and predator protection until they gain size. To track numbers produced and stocked, manage all fry from one hatching trough as a single unit. Disease problems can significantly impact hatchery success. Fry pond management involves several steps, including pumping costs, fertilizer application, and weed or predator control. According to research at Mississippi State University, expect to spend around $80 per water acre on fry pond preparation. The first step is draining the pond, removing trash fish and leftover catfish fingerlings or stockers from the previous year. In some cases, green sunfish or bullheads can cause high mortality rates by preying on catfish fry. Yearling fingerlings and stockers can compete for food, reducing fry growth and survival. If you're confident there are no holdovers or trash fish, it's not necessary to dry the pond bottom completely. Keeping the bottom moist will help establish a good bloom when refilling the pond. Ideally, fry should be stocked within two weeks of filling the pond, unless a bloom cannot develop or well water is high in iron or ammonia. Begin filling ponds as needed based on pumping capacity and add fertilizer every other day for the first eight days to establish a visible bloom. Apply cottonseed meal, soybean meal, or catfish feed daily until the bloom reaches 15-18 inches. Aim to get a rapid bloom to provide natural food and minimize predator establishment. Allowing fry to outgrow predators is more profitable than controlling them with chemicals. Never use unapproved insecticides in fry or fingerling ponds. To achieve optimal growth rates, feed the fish at surface level for approximately four weeks, providing twice a day, with each feeding session lasting up to 20 minutes. Supplementing smaller pellets and higher protein levels can further enhance growth and minimize size differences. Under ideal conditions, fry stocked at a density of 50,000-70,000 per acre should reach lengths of 5-8 inches within their first growing season.

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