

# AQUACULTURE

## SUMMARY OF 2015 CASE SUBMISSIONS TO THE AQUATIC RESEARCH AND DIAGNOSTIC LABORATORY

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**ALTHOUGH THERE ARE INHERENT BIASES, DIAGNOSTIC LABORATORY CASE SUBMISSION DATA PROVIDES CRITICAL INSIGHT TO THE CHANGES IN PREVALENCE OF DISEASES AS WELL AS THE PATHOGENS.**

The Aquatic Research and Diagnostic Laboratory (ARDL), at Delta Research and Extension Center provides diagnostic services to producers in South-eastern United States and diagnostic support to on-going disease and production research. Diagnostic records provide critical insight to changes in disease trends and emergence of new diseases affecting animal production systems, an essential component of population health management. This information provides clinicians, caregivers and researchers a good cross-section of disease occurrence across the industry and is used to prioritize the allocation of resources for the development of rapid diagnostic procedures, disease surveillance and treatment programs and implementation of biosecurity measures.

In 2015, ARDL received a total of 599 case submissions involving, bacterial, parasitic, viral and histopathological evaluations. There were also 708 water samples submitted for analysis. Bacterial diseases were the predominant diagnosis for the submissions. Columnaris disease was diagnosed in 325 submissions with no isolates exhibiting resistance to the three antibiotics tested (Terramycin, Romet and Aquaflor). *Edwardsiella ictaluri*, the causative agent

of Enteric Septicemia of catfish, was isolated from 162 submissions, 158 of which were from producers. Twenty-two of these isolates demonstrated some level of antimicrobial resistance, although some of these isolates were from repeat submissions. Twenty isolates were resistant to Terramycin with intermediate resistance to Aquaflor, while 2 were resistant to Terramycin with intermediate resistance to both Romet and Aquaflor. There were 12 *E. tarda* (syn. *E. piscicida*) cases, all of which were susceptible to the 3 antibiotics. Most of these were isolated from hybrid catfish except for two, one from channel catfish and one from largemouth bass. There were 26 atypical *Aeromonas hydrophila* (VAh) cases that demonstrated lesions and biochemical profiles associated with an emergent, highly virulent strain of the pathogen. In addition to this, four *A. hydrophila* cases had lesions suggestive of the VAh but possessed a different biochemical profile. No antibiotic resistance was seen in any of these 30 isolates. There were an additional 10 *Aeromonas* isolates that could not be identified to species by routine biochemical tests. One these isolates was resistant to Terramycin. Of the parasitic diseases, there were 55 cases of

Proliferative Gill Disease, 14 cases of *Bolbophorus* trematode and 2 cases of *Ichthyophthirius multifiliis* (white spot; Ich). Lastly there were 10 channel catfish virus cases. Of the 580 total catfish cases, 320 were channel catfish, 250 were hybrid catfish and 18 were blue catfish. This information is a summary of a more comprehensive report that is archived on the Thad Cochran National Warmwater Aquaculture Center website (<http://tcnwac.msstate.edu>). Florfenicol was shown equally effective in controlling mortality associated with *E. ictaluri* infection in channel, hybrid and blue catfish. Research data are being used to extend the use of florfenicol in other bacterial species affecting catfish. Antimicrobial susceptibilities of catfish pathogens *E. ictaluri* and *E. piscicida* were determined by three independent laboratories. Frequency distribution of (MIC) values was used to set epidemiologic breakpoints. These values will be used to discriminate between wild-type (i.e. originally susceptible bacterial populations) from non-wild type (i.e. populations with acquired and mutational resistance mechanism) isolates and help determine susceptibility of bacteria to antimicrobials.

Information garnered from diagnostic case submissions was used to initiate research evaluating factors leading to the spread of atypical *A. hydrophila* in commercial catfish production systems. Previous ARDL work led to the approval of new antibiotic (AQUAFLOX) for treatment of *E. ictaluri* and *Flavobacterium columnare* in catfish. Current work is being conducted to extend the use of AQUAFLOX for control of *A. hydrophila* and *E. piscicida* infection in catfish. Antimicrobial susceptibility data has been submitted to the Veterinary Antimicrobial Susceptibility Testing (VAST) subcommittee for evaluation and determination of quality control ranges by the Clinical Laboratory Standards Institute (CLSI). Once the quality control ranges are accepted by the VAST, data will be published in the CLSI VET05-A2 guideline in 2016. The data will be used in clinical evaluations to determining effective recommendations for control of bacterial infections in catfish. In support of diagnostic research, multiplex quantitative polymerase chain reactions assays were developed for predominant fish pathogens affecting commercial catfish culture and are being used in disease monitoring programs.