

**2011 ANNUAL CASE SUMMARY REPORT**  
**AQUATIC RESEARCH & DIAGNOSTIC LABORATORY**

Mississippi State University  
College of Veterinary Medicine  
Thad Cochran National Warmwater Aquaculture Center  
Stoneville, MS 39776  
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**MISSION STATEMENT**

The Aquatic Diagnostic Laboratory is dedicated to the success of Mississippi's commercial catfish industry through service, research, and teaching. Our staff and fish health professionals strive to support the industry's efforts to produce a high quality, economical and profitable product. Our goals are derived from the needs of the industry and aimed at developing management strategies for controlling the impact of diseases that affect profitability. These goals can only be accomplished through mutual respect, cooperation, and the maintenance of a close supportive relationship with our clients.

**2011 CVM AQUATIC RESEARCH & DIAGNOSTIC LABORATORY SUMMARY**

**Diagnostics**

In 2011, the Aquatic Research & Diagnostic Laboratory (ARDL) at Stoneville received a total of 599 producer submitted fish diagnostic cases. These cases were received from 54 different farms. This is a 14.1 % increase in the number of submissions over the 525 cases in 2010. There were an additional 253 cases submitted by researchers for a total of 852 cases. There were 1060 water quality samples that were analyzed representing a 20.95% decrease from the 1341 samples received in 2010.

Individual case submissions represent a composite sample of fish collected from a single pond on a given day. The numbers reported are derived solely from submissions processed by the ARDL and do not necessarily reflect actual disease incidence in the field. Routine diagnostic procedures include evaluation of gill clips and skin scrapes for parasites, external and internal examination for signs of disease, bacterial and viral cultures, histopathology, and water quality evaluation. The ARDL works closely with Mississippi Agriculture Forestry and Experiment Station (MAFES) fish health professionals to offer treatment recommendations, monitor disease trends, provide surveillance for new and emerging diseases, provide field service investigation, and maintain a database of epidemiologic information on diseases of catfish. The ARDL supports the research efforts of other National Warmwater Aquaculture Center (NWAC) units, including MAFES, Mississippi State University -Extension Service, College of Veterinary Medicine, and United State Department of Agriculture – Agriculture Research Service (USDA/ARS) Catfish Genetics Research Unit. Furthermore, the laboratory provides an outlet for the dissemination of information gained from research efforts back to producers.

Bacterial diseases dominated the number of cases submitted as in previous years. However, there were more *Edwardsiella ictaluri* cases this year (195 cases or 22.9% of the total cases submitted) than *Columnaris* (167 cases or 19.6%). As single entities there

were 91 cases of *E. ictaluri* and 25 cases *F. columnare*. There were no incidences of antibiotic resistance for the two major bacterial diseases in catfish with only intermediate sensitivity to Romet in one *E. ictaluri* case and 2 *Aeromonas* sp. cases. There were also 3 cases of the virulent strain of *Aeromonas hydrophila* from area farms.

Proliferative gill disease (PGD) remained the most commonly diagnosed parasitic disease and was seen in 122 submissions. Interestingly, there were no submissions with *Ichthyophthirius multifiliis* (Ich) while *Bolbophorus* sp. trematode cases comprised 1.1% of cases submitted, just slightly lower than the previous year. Farmers are encouraged to continue surveillance efforts and to control rams horn snails (intermediate host of the parasite) with lime or copper sulfate treatments, particularly if pelicans have been observed visiting their ponds. *Bolbophorus* sp. trematodes are capable of killing fingerlings and increasing susceptibility to ESC, as well as decreasing feed consumption in larger fish. This can result in significant economic losses even with mild infestations.

Saprolegnia was seen in 4.0% of the cases submitted, close to the previous year (4.4%). There were exactly the same number of channel catfish virus (CCV) disease cases (29) as the previous year. There were 49 (5.8%) cases of anemia last year which was close to the previous year of 5% of the cases. Visceral toxicosis of catfish (VTC) made up 1.5% of cases submitted. These last two diseases are still diseases of research interest because of the economic impact. Producers are highly encouraged to submit cases of these diseases.

With the interest in hybrid catfish, we have listed the numbers of hybrid as well as blue catfish cases submitted by month in the case summary table. Listed here are the specific number of those diseases for each of those catfishes since that specific data are not separated out in the comprehensive case summary table below.

**Blue catfish**

<b>Disease Name</b>	<b>Number of Cases</b>
Columnaris	1
Methemoglobinemia (brown blood)	1
<b>Total</b>	<b>2</b>

**Hybrid Catfish**

<b>Disease Name</b>	<b>Number of Cases</b>
Ammonia toxicity	1
Anemia	9
Bolbophorus	1
Clinostomum sp.	1
Columnaris disease	4
Columnaris, External	3
<i>Edwardsiella tarda</i>	2
<i>Edwardsiella tarda</i> , Columnaris disease	1
<i>Edwardsiella tarda</i> , Proliferative Gill Disease (PGD)	2
Enteric Septicemia of Catfish (ESC)	27

Enteric Septicemia of Catfish (ESC), Anemia	1
Enteric Septicemia of Catfish (ESC), Columnaris	5
Enteric Septicemia of Catfish (ESC), External columnaris	3
Enteric Septicemia of Catfish (ESC)/Bolbophorus	1
Health check	1
Methemaglobinemia (brown blood), saprolegnia	1
No infectious disease identified	19
Proliferative Gill Disease (PGD)	6
Toxin (rotonone presumptive)	1
VHS testing	14
<b>Total</b>	<b>103</b>

We are here to serve the industry and encourage producers to continue to take advantage of the diagnostic service.

## Highlights

Research continues on the antibiotic florfenicol (Aquaflor®). The drug’s sponsor Intervet/Schering–Plough Animal Health has funded pharmacokinetic studies to help determine the drug’s duration in catfish and give us a better understanding of its ability to control ESC and Columnaris Disease.

Results from the “Efficacy of florfenicol for the control of mortality caused by *Flavobacterium columnare* infection in channel catfish” conducted by MSU CVM were accepted by FDA late 2010. This study along with one conducted by the USFWS in Bozeman cleared the way for an all freshwater-reared warmwater fish columnaris claim for florfenicol. This new label claim will become effective as of May 1, 2012.

With help from MAFES researchers, faculty at the ARDL are currently investigating the life stages and biology of *Henneguya ictaluri*, the causative agent of proliferative gill disease (hamburger gill). In addition to the biology of the parasite, researchers are also investigating novel management strategies to reduce the impact of proliferative gill disease on catfish production.

Faculty of the ARDL have continued to cooperate with researchers from Alabama, Arkansas and Louisiana to develop rapid diagnostic methodologies for an unusually virulent strain of *Aeromonas hydrophila*, which has been implicated in significant losses in Alabama. This continues to be a problem in Alabama and east Mississippi and there have been a few cases in the Delta.

Research is also being conducted on the life cycle of another digenetic trematode, *Drepanocephalus spathans*, a parasite of the double-crested cormorant, that has demonstrated the ability to infect juvenile channel catfish. The impacts this trematode

has on catfish production are being investigated together with another digenetic trematode that also uses the rams horn snail as an intermediate host..

Work also continues on the development of molecular based assays to detect and quantify *Edwardsiella ictaluri*, *Edwardsiella tarda*, and *Flavobacterium columnare* in the pond environment. This will provide methods to better evaluate management schemes aimed at controlling diseases caused by these bacteria.

Visceral Toxicosis of Catfish continues to be an area of active research. We would like to continue to enlist the assistance of farmers to bring suspect VTC fish to the ARDL. Ongoing VTC research requires a supply of blood from affected fish and submission of affect fish to the ARDL will help us understand how widespread the disease is and what pond factors may be triggering outbreaks.

We also solicit producers' help with anemia in our efforts to understand its cause. Although there are several diseases and toxins that can result in an anemic condition in fish, the etiology of the profound anemia that is seen typically in foodfish is unknown. Producers with anemic fish are also highly encouraged to submit those fish and keep accurate records on pond information.

#### **Scientific Publications:**

Gaunt P, Langston C, Wrzesinski C, Gao D, Adams P, Crouch L, Sweeney D, and Endris R (2011) Single intravenous and oral dose pharmacokinetics of florfenicol in the channel catfish (*Ictalurus punctatus*) *Journal of Veterinary Pharmacology and Therapeutics* doi:10.1111/j.1365-2885.2011.01340.x.

Gaunt P, Gao D, Wills R (2011) Preparation of ormetoprim-sulfadimethoxine-medicated discs for disc diffusion assay. *North American Journal of Aquaculture*. *North American Journal of Aquaculture* 73:17-20.

Griffin MJ, Goodwin AE. (2011) *Thelohannelus toyamai* (syn. *Myxobolus toyamai*) from the gills of koi in the eastern USA. *Journal of Parasitology*. 97: 493-502.

Griffin MJ, Mauel MJ, Greenway TE, Khoo LH, Wise DJ. (2011) A real-time polymerase chain reaction assay for the detection of *Edwardsiella ictaluri* in commercial channel catfish ponds. *Journal of Aquatic Animal Health*. 23: 178-188.

Khoo L., D. Wise, L. Pote, A. Mitchell, T. Byars, Yost M, Doffitt C, Dorr B, George B, King D, Hanson T, Tucker T, Greenway T, Griffin M, Camus A, Panuska C. (2011). Ameliorating the effects of the digenetic trematode, *Bolbophorus damnificus* on the channel catfish industry. Pages 237-242 in Cipriano, RC, Bruckner AW, and Shchelkunov IS, editors. *Bridging America and Russia with shared perspectives on Aquatic Animal Health*. Proceedings of the Third Bilateral Conference between Russia and the United States. 20 July 2009. Shepherdstown, West Virginia. Khaled bin Sultan Living Oceans Foundation, Landover, Maryland, USA.

Khoo LH, Goodwin AE, Wise DJ, Holmes WE, Hanson LA, Steadman JM, McIntyre LM, Gaunt PS (2011). The pathology associated with visceral toxicosis of catfish. *Journal of Veterinary Diagnostic Investigation*, 22(6): 1217-1221

Mischke CC, Griffin MJ. (2011) Laboratory mass culture of the freshwater oligochaete *Dero digitata*. *North American Journal of Aquaculture*. 73:13-16.

Mitchell AJ, Khoo L. (2011) Trematode infections in farm-raised fish: Reasons for infections, their impacts, and management of infections on fish farms. pp 231 – 236, in: Cipriano R, Bruckner A and Shchelkunov I (editors): *Bridging America and Russia with Shared Perspectives on Aquatic Animal Health*. Proceedings of the Third Bilateral Conference Between the United States and Russia: Aquatic Animal Health 2009. 12-20 July 2009. Shepherdstown, West Virginia. Khaled bin Sultan Living Oceans Foundation, Landover, Maryland, USA.

### **Presentations/abstracts/posters:**

Chatla K, Hanson L, Hanson L, Gaunt P. Zebrafish (*Danio Rerio*) as a Model to Study the Effects of Botulinum Neurotoxin-E and Visceral Toxicosis of Catfish. 7th Triennial Basic and Therapeutic Aspects of Botulinum and Tetanus Toxins. October 2-5, 2011, Santa Fe, New Mexico.

Chatla K, Gaunt PS, Hanson. Zebrafish (*Danio Rerio*) As A Model To Study the Effects of Visceral Toxicosis Of Catfish and Botulinum Neurotoxin-E. June 15-16, 2011 Annual Meeting Fish Health Section of the American Fisheries Society, Nanaimo, BC, Canada.

Gaunt PS. Best Treatment Practices: Using Aquaflor® medicated feed against Warmwater Fish Pathogens World Aquaculture Society 2011, Natal, Brazil June 6, 2011.

Gaunt PS, Khoo L. Therapies for managing bacterial disease outbreaks on catfish farms. Proceedings of the 36<sup>th</sup> Eastern Fish Health Workshop, p. 14, Mt. Pleasant, SC March 28 – April 1, 2011.

Gibbs G.D, Mauel MJ, Griffin MJ, Lawrence ML. Specificity and Sensitivity of a Real-time Polymerase Chain Reaction to *Flavobacterium columnare*. In proceedings of the 37th Annual Mississippi Chapter of the American Fisheries Society. Mississippi State University, MS, USA. February 2011.

Gibbs GD, Mauel MJ, Griffin MJ, Lawrence ML. Specificity and Sensitivity of a Real-time Polymerase Chain Reaction to *Flavobacterium columnare*. In proceedings of the 52nd Joint Western Fish Disease Workshop and AFS Fish Health Section Meeting. Nanaimo, British Columbia, Canada. June 2011.

- Griffin MJ. Smallmouth buffalo for control of proliferative gill disease in catfish ponds. NWAC Winter Seminar. Starkville, MS, USA. December 2011
- Griffin MJ. Smallmouth buffalo for control of proliferative gill disease in catfish ponds. NWAC Winter Seminar. Stoneville, MS, USA. December 2011
- Griffin M, Wise D, Quiniou S, O’Hear M, Pote L, Khoo L. *Drepanocephalus spathans*: another reason to control snail populations in commercial catfish ponds. Proceedings of the 36<sup>th</sup> Eastern Fish Health Workshop, p. 38, Mt. Pleasant, SC March 28 – April 1, 2011.
- Griffin MJ, Greenway TE, Wise DJ. Potential for biological control of proliferative gill disease in catfish aquaculture. *In* proceedings of the Eastern Fish Health Workshop. Charleston, SC, USA. April 2011.
- Griffin MJ, Greenway TE, Wise DJ. Biological control of proliferative gill disease in catfish aquaculture. *In* proceedings of the World Aquaculture Society Aquaculture America (2011). New Orleans, LA, USA. February 2011.
- Griffin MJ, Goodwin AE. *Thelohanellus toyamai* (syn. *Myxobolus toyamai*) infecting the gills of koi *Cyprinus carpio* in the Eastern USA. *In* proceedings of the World Aquaculture Society Aquaculture America (2011). New Orleans, LA, USA. February 2011.
- Griffin M, Wise D Quiniou SMA, Khoo L. Just when you thought it was safe: another digenetic trematode that infects channel catfish. Abstract #256 Aquaculture America 2011, New Orleans, LA Feb 28- March 3, 2011
- Khoo LH, Wilkens JL, Wolf JC, Steadman JM. The demise of the survivor from Enid Lake. Proceedings of the 36<sup>th</sup> Eastern Fish Health Workshop, p. 4, Mt. Pleasant, SC March 28 – April 1, 2011.
- Khoo L. 36<sup>th</sup> Eastern Fish Health Workshop – Continuing education session - Examination of the gastrointestinal tract of fishes. Mt. Pleasant, SC, March 28 – April 1, 2011.
- Khoo L. Virulent *Aeromonas hydrophila* Update. Thad Cochran National Warmwater Aquaculture Center Winter Seminar Program, Starkville, MS, December 8, 2011.
- Khoo L. Diseases seen in Hybrid Catfish. Thad Cochran National Warmwater Aquaculture Center Winter Seminar Program Stoneville, MS, December 12, 2011.
- Liles MR, Hemstreet W, Capps N, Garcia J, Waldbieser GC, Griffin MJ, Goodwin AE, Hossain MJ, Williams MA, Bebak J, Terhune JS. Comparative biochemistry and genomics of *Aeromonas hydrophila* isolates from an epidemic in channel catfish.

American Society of Microbiology: Southeastern Branch. Gainesville, FL, USA.  
October 2011

Liles MR., R Hemstreet W, Waldbieser GC, Griffin MJ, Hossain MJ, Williams MA, Hayden K., Terhune JS. Comparative genomics of *Aeromonas hydrophila* isolates from an epidemic in channel catfish. *In* proceedings of the International World Aquaculture Society meeting. Natal, Brazil. June 2011.

Liles MR., R Hemstreet W, W Waldbieser GC, Griffin MJ, Khoo L, Bebak JA, Garcia JC, Goodwin AE, Capps N, Hayden K, Terhune JS. Comparative genomics of *Aeromonas hydrophila* isolates from an epizootic in channel catfish. *In* proceedings of the 111<sup>th</sup> general meeting of the American Society for Microbiology. New Orleans, LA, USA. May 2011.

Mauel MJ, LM. McIntyre, PS Gaunt, Khoo LH. Plasma Biochemical Reference Intervals for Tank Raised Channel Catfish Fingerlings (*Ictalurus punctatus*) Utilizing a Portable Bench Top Analyzer. June 15-16, 2011 Annual Meeting Fish Health Section of the American Fisheries Society, Nanaimo, BC, Canada.

Small B, Quiniou S, Warren J, Ott L, Khoo L. Testicular germ cell transplantation: can it be used for hybrid catfish fry production? Abstract # 10 Aquaculture America 2011, New Orleans, LA Feb 28- March 3, 2011.

# Mississippi State University - College of Veterinary Medicine

## Aquatic Research & Diagnostic Laboratory - Stoneville, MS

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#### Disease Diagnoses as a Percentage of Total Case Submissions (Diagnostic & Research)

Disease/Diagnosis	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	%
<i>Aeromonas hydrophilia</i>								1	2				3	0.35%
<i>Aeromonas sobria</i>						1							1	0.12%
<i>Aeromonas</i> sp., external Columnaris (Col)										1			1	0.12%
<i>Aeromonas</i> spp.				1		1							2	0.23%
Ammonia toxicity	1						2						3	0.35%
Anemia				2		1		3	8	11			25	2.93%
Anemia, external columnaris									1				1	0.12%
Anemia, Saprolegnia	1												1	0.12%
Anemia, Saprolegnia, external columnaris									1				1	0.12%
Biotoxin	2												2	0.23%
Bolbophorus						5	1						6	0.70%
Bony tumor	1												1	0.12%
Branchial cartilage malformation				1									1	0.12%
Branchial cartilage malformation, exophthalmia				1									1	0.12%
Branchitis				4									4	0.47%
Branchitis, hemorrhagic enteritis				1									1	0.12%
Buphthalmia							1						1	0.12%
Channel catfish virus (CCV)							8						8	0.94%
Channel catfish virus (CCV), <i>Aeromonas</i> sp.							1						1	0.12%
Channel catfish virus (CCV), external columnaris								1					1	0.12%
<i>Clinostomum</i> sp.				1									1	0.12%
Columnaris (Col)				1	2	2	1	3	13	3			25	2.93%
Columnaris (Col), anemia						1		1	2	2			6	0.70%
Columnaris (Col), CCV						1	9						10	1.17%
Columnaris (Col), CCV, <i>Aeromonas</i> sp.							8						8	0.94%
Columnaris (Col), <i>Edwardsiella tarda</i>								2					2	0.23%



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Columnaris (Col), Proliferative gill disease, <i>E. tarda</i>					1								1	0.12%
Columnaris (Col), Proliferative gill disease, Anemia					1								1	0.12%
Columnaris (Col), Proliferative gill disease, Saprolegnia											1		1	0.12%
Columnaris (Col), Proliferative gill disease, Steatitis				1									1	0.12%
Columnaris (Col), Saprolegnia	2			1							2		5	0.59%
Columnaris Col), Proliferative Gill Disease (PGD)			2	2	3	1							8	0.94%
Columnaris External					2			1	4	1			8	0.94%
<i>Cryptocaryon irritans</i>							1						1	0.12%
<i>Edwardsiella tarda</i>							1	1	1				3	0.35%
<i>Edwardsiella tarda</i> , Anemia									1				1	0.12%
<i>Edwardsiella tarda</i> , External Columnaris					1	1	1	1					4	0.47%
<i>Edwardsiella tarda</i> , PGD				1	1			2					4	0.47%
<i>Edwardsiella tarda</i> , PGD, Saprolegnia					1								1	0.12%
<i>Edwardsiella tarda</i> , PGD, Steatitis				1									1	0.12%
<i>Edwardsiella tarda</i> , Saprolegnia		1											1	0.12%
Enteric Septicemia of Catfish (ESC)		2		1	13	3	6	16	36	9	4	1	91	10.68%
ESC, Anemia					2	1			2				5	0.59%
ESC, Anemia, External Columnaris									1	1			2	0.23%
ESC, <i>Bolbophorus</i>						1		1					2	0.23%
ESC, Columnaris					5		5	5	30	4			49	5.75%
ESC, Columnaris, <i>Aeromonas</i>										2			2	0.23%
ESC, Columnaris, <i>Aeromonas</i> , Anemia										2			2	0.23%
ESC, Columnaris, Anemia										1			1	0.12%
ESC, Columnaris, CCV							1						1	0.12%
ESC, Columnaris, PGD					3	1	1			1	1		7	0.82%
ESC, Columnaris, PGD, <i>Aeromonas</i>										1			1	0.12%
ESC, <i>Edwardsiella tarda</i> , External Columnaris									1				1	0.12%

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ESC, External Columnaris					4	1		2	3	1			11	1.29%
ESC, PGD					5	4	1		1	2	1		14	1.64%
ESC, PGD, External Columnaris					1								1	0.12%
ESC, PGD, External Columnaris, Saprolegnia, Anemia				1									1	0.12%
ESC, Saprolegnia					1								1	0.12%
ESC, Saprolegnia, External Columnaris			1										1	0.12%
Fibroma			1										1	0.12%
Health Check				4		23		20					47	5.52%
Largemouth Bass Virus						2							2	0.23%
Meningitis, enteritis, nephritis									1				1	0.12%
Meningoencephalitis, myositis, granuloma									1				1	0.12%
Methemaglobinemia (brown blood)								1			1		2	0.23%
Methemaglobinemia, Saprolegnia												1	1	0.12%
Methemaglobinemia, Saprolegnia, Anemia			1										1	0.12%
No evidence of infectious disease	10	6	5	7	14	11	9	15	9		2	1	89	10.45%
Parasitism				1									1	0.12%
Peritonitis				1									1	0.12%
Proliferative Gill Disease (PGD)	1	10	2	24	15	6			1		1		60	7.04%
Proliferative Gill Disease (PGD), <i>Aeromonas sp.</i>								1					1	0.12%
Proliferative Gill Disease (PGD), Anemia					1								1	0.12%
Proliferative Gill Disease (PGD), Bolbophorus						1							1	0.12%
Proliferative Gill Disease (PGD), External Columnaris			1		1								2	0.23%
Proliferative Gill Disease (PGD), Parasitism				1									1	0.12%
Proliferative Gill Disease (PGD), Saprolegnia		3			1								4	0.47%
Proliferative Gill Disease (PGD), Saprolegnia, Steatitis			1	1									2	0.23%
Proliferative Gill Disease (PGD), Steatitis			2	3	1								6	0.70%
Proliferative Gill Disease (PGD), Steatitis, VTC suspect			1										1	0.12%

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Proliferative Gill Disease, VTC suspect					1								1	0.12%
Research	1	1		1	4	3	80	1		8	5	3	107	12.56%
Saprolegnia	7	4											11	1.29%
Saprolegnia, External Columnaris											1		1	0.12%
Steatitis			2	1									3	0.35%
Toxin (euglena suspect)		1											1	0.12%
Toxin (rotonone presumptive)		1											1	0.12%
Trematodiasis (non bolbophorus)							1						1	0.12%
VHS testing		35	21	12							61	9	138	16.20%
Visceral toxicosis of catfish (VTC) confirmed			2	1									3	0.35%
Visceral toxicosis of catfish (VTC) suspect	2	2	1										5	0.59%
Visceral toxicosis of catfish (VTC) suspect, Steatitis				1									1	0.12%
Visceral toxicosis of catfish (VTC), ESC			1										1	0.12%
Visceral toxicosis of catfish (VTC), ESC, Saprolegnia			1										1	0.12%
<b>Cases submitted by Farmers</b>	<b>21</b>	<b>62</b>	<b>45</b>	<b>64</b>	<b>76</b>	<b>34</b>	<b>54</b>	<b>42</b>	<b>82</b>	<b>39</b>	<b>70</b>	<b>10</b>	<b>599</b>	<b>70.31%</b>
<b>Cases submitted for Research</b>	<b>7</b>	<b>4</b>		<b>14</b>	<b>8</b>	<b>37</b>	<b>84</b>	<b>36</b>	<b>37</b>	<b>11</b>	<b>9</b>	<b>6</b>	<b>253</b>	<b>29.69%</b>
<b>Channel catfish cases</b>	<b>24</b>	<b>61</b>	<b>38</b>	<b>66</b>	<b>66</b>	<b>57</b>	<b>132</b>	<b>53</b>	<b>93</b>	<b>43</b>	<b>58</b>	<b>14</b>	<b>705</b>	<b>82.7%</b>
<b>Blue catfish cases</b>						1					1		2	0.2%
<b>Hybrid catfish cases</b>	3	5	2	10	18	3	5	18	26	7	13	2	112	13.1%
<b>Other Species</b>	1		5	2		10	1	7			7		33	3.9%
<b>TOTALS</b>													<b>852</b>	
<b>Water Farms</b>	<b>10</b>	<b>12</b>	<b>9</b>	<b>14</b>	<b>19</b>	<b>12</b>	<b>17</b>	<b>13</b>	<b>16</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>137</b>	
<b>Quality Ponds</b>	<b>51</b>	<b>69</b>	<b>47</b>	<b>121</b>	<b>204</b>	<b>149</b>	<b>173</b>	<b>49</b>	<b>92</b>	<b>33</b>	<b>38</b>	<b>34</b>	<b>1060</b>	