MISSISSIPPI STATE UNIVERSITY

DEPARTMENT OF ZOOLOGY
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10 March 1967

cc. Papageorge
CARDER
LEISY
DUNLAP
MILLER
SIMPSON

Mr. L. C. Fuhrmeister
Technical Services Superintendent
Monsanto Chemical Company
Anniston, Alabama

Dear Mr. Fuhrmeister:

The following is a brief report of some recent developments, especially those related to our trip last week.

First, some bad news. Both of our gas chromatographs are down and it will be a while before we are able to have them repaired. We have a large number of samples being processed.

On March 5, we collected a water sample from Dry Creek (at the Hiway 202 bridge). The attendant at the service station said that fish had been killed in the creek. This man claims that several cattle died as a result of drinking from Dry Creek. He said that on Friday afternoons the creek is a real mess. However, when we collected the water samples, I observed live mosquitofish in the creek, thus, I am not convinced that the stream is as bad as he thinks. Some samples should be taken on Fridays and used for bioassay tests of bluegills.

I gave the Mississippi State Chemical Lab 2 bluegills and a carp for mercury analyses. They seemed to doubt that they could do a quantitative analysis, but promised to do their best. If you people have competent chemists who could do mercury analyses on some of the dead fish from down stream, I suggest that you get them busy, especially in view of the cholinesterase data below.

We caught a number of fish of several species at Jackson Shoals, including some minnows and small bass for residue analysis on GLC.

On March 5, we obtained 23 small bluegills from Choccolocco Creek at Jackson Shoals (ca. 150 yards below the confluence of Eastaboga Creek). Cholinesterase levels were determined for 20 of these fish using the brains of 2 fish as a single sample. On March 7, cholinesterase levels were run on 10 bluegills from our control population at the Country Club. Procedure, chemicals, and other variables were identical in tests of these two groups of fish.

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In Table 1, A-1 through A-10 are bluegills collected from Choccolocco Creek at Jackson Shoals; C-1 through C-5 are control bluegills from Country Club Lake.

Table 1. Comparison of AChE levels in Choccolocco Creek and State College bluegills.

Sample No.	Brain Wt.	Optical Density	μM ACh Hydrolyzed 20'	60'	Specific Activity	Average
A-1	67.5	.209	2.07	6.21	1.77	
A-2	76.2	.210	2.07	6.21	1.77	
A-3	66.1	.164	1.62	4.66	1.39	
A-4	91.2	.175	1.73	5.19	1.48	
A-5	81.7	.185	1.83	5.49	1.58	1.72
A-6	56.6	.233	2.30	6.90	1.98	
A-7	58.6	.242	2.38	7.14	2.04	
A-8	53.7	.265	2.63	7.89	2.25	
A-9	62.2	.170	1.67	5.01	1.43	
A-10	73.4	.185	1.81	5.43	1.55	
C-1	101.4	.200	1.96	5.88	1.68	
C-2	102.5	.167	1.65	4.95	1.41	
C-3	90.8	.187	1.85	5.55	1.59	1.47
C-4	84.8	.170	1.66	4.98	1.43	
C-5	110.9	.145	1.42	4.26	1.22	

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Please note that the Choccolocco Creek bluegills have higher cholinesterase values than our controls. Although, these values may not be absolutely correct, they are close enough to assure us that there is no inhibition in the Choccolocco samples. Our average value (1.72) compares favorably with those of control bluegills from Choccolocco Creek that were reported by the SE Water Lab, especially if their very large specimens are omitted. (Note: Small fish tend to have higher AChE activity per unit weight of brain tissue.) Also, in our tests each value represents two brains; they ran individual fish. Our controls compare favorably with controls that we have caged upstream from Anniston in Choccolocco Creek.

Table 2. Water quality data collected March 4, 1967.

Location	Time	pH	Temp (°C)	D. O. (ppm) Surface	Elbow Depth
Choccolocco Creek - 4 mi. E. Boiling Spring	11:30	7.7	12.0	9.0	8.5
Anniston Sewage Plant	Noon	7.2	18.0	4.8	---
Choccolocco Creek - Flat Bridge	1:30	7.7	13.0	8.0	7.7
Choccolocco Creek - Hiway #93 Bridge	2:00	8.0	14.0	8.3	8.8
Choccolocco Creek - Hiway #77 Bridge	---	---	---	8.9	8.5

We hope to get more AChE data soon. If fish continue to die in Choccolocco Creek and if AChE levels continue to show no inhibition, it will be obvious that some other lethal factor is operating. Such findings should aid the lawyers in building their case.

I am leaving Sunday for a meeting in San Francisco. If you need to contact our group before the end of next week, please call Larry Ludke.

Sincerely yours,

Denzel E. Ferguson
Professor of Zoology

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