Final Progress Report to Monsanto Company, Residue Data, November, 1970 to November, 1972

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MONS 044310

Introduction:

For the past two years (November, 1970 to November, 1972) consultants have conducted a biological survey of the streams affected by Monsanto Company's prior discharge of polychlorinated biphenyls at Anniston, Alabama. The streams and areas studied were: Choccolocco Creek, Coosa River, Logan Martin Reservoir, Cheaha Creek, Cane Creek, Aker Creek. The survey consisted of two separate but related parts: 1) An ichthyological survey of the waters designed to determine species composition and relative abundance of the various species of fishes present with the goal of ascertaining any possible effects the Monsanto effluent might have on the fish populations, and 2) a residue analysis conducted by Monsanto Company using fishes from ten (10) stations supplied by Consultants. We have interpreted the residue findings on a trip-by-trip basis during the first two years of the present study as they have been made available by Monsanto employees. In this connection we have worked rather closely with Mr. J. T. Bell, Plant Chief Chemist, and Mr. Donald Turner of the Anniston plant who made the actual analyses.

General Background:

As stated many times previously Consultants have found a rather large number of deformed fishes below the point of effluent discharge, as well as many fishes that were hemorrhaging or exhibiting various degrees of nervous system damage. These instances are on record at the Monsanto Plant, Anniston. Since these fishes are found in parts of the stream that were characterized by high P.C.B. levels, one must admit the possibility that debilitation is due directly to P.C.B's or to other products manufactured by Monsanto Company.

In a past summary report covering an analysis of five sets of P.C.B. data for trips made during December, 1970; March, 1971; June, 1971; September, 1971; and December, 1971, we have shown that there was no decrease in P.C.B. levels during this time, that is to say the levels within a given species of fish have remained fairly constant, although there have indeed been some fluctuations as one would expect. After subsequent examination of the residue data for the June, 1972 sample of fishes we reported that there seemed to be some real decreases in residue levels, but that the September, 1972 sample would be more definitive in this respect since this would be the first sample of fishes collected after complete stoppage of P.C.B. effluents from the Anniston Plant.

Summary report for residue data for two-year period:

Part A.

We have selected three samples of fishes for a year-to-year analysis of residue data from December, 1970 to December, 1971, to September, 1972, the last collection of fishes made for residue analysis. Using only pairs of respective values reflecting changes from one year to the next Work Sheet #1 will show that there are eighteen such values for the period December, 1970 to December, 1971; of these 18, 10 show a decrease in residue level but 8 show an increase. For the period December, 1971 to September, 1972, Work Sheet #1 will show that there are sixteen such values; of these 14 show a decrease in residue level and only two show an increase. This means then that there is a significant decrease in residue levels during the second year of the study as a result of the lower levels that prevailed for the September, 1972 sample (again see Work Sheet #1).

Part B.

We have selected the last two quarterly surveys (June, 1972 and September, 1972) for a detailed look at the residue picture since some P.C.B. components were still being released, i.e. could have been picked up by fishes, at this time. By the time the fish sample was collected in September, 1972, as stated previously, the effluent from the Monsanto Plant was free of P.C.B's. Again, by examining paired values for the various species of fishes collected and analyzed, one finds that there are 19 pairs of values (see Work Sheet #2) for the fishes; of these 17 show a decrease in residue levels and only two show an increase. It is quite obvious then that there has been a very significant decrease in P.C.B. residues in the various species of fishes subsequent to a stoppage of P.C.B. effluent for the Anniston Plant.

Recommendation:

Since only one of the survey trips was made subsequent to stoppage of P.C.B. effluent flow from the Anniston Plant, as compared to seven trips prior to stoppage, we recommend again that the study be continued for at least one more year in order to follow the changes in residue levels with the passage of time. Specifically, we recommend that a survey trip be made by Consultants in March, 1973 and in September, 1973, as originally proposed, since the last survey was made during September, 1972.

Work Sheet #1

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Monsanto Company = Residue Analyses

A-1254 Wet weight, plus lipid weight in parentheses. Results in ppm.
— means none found

COLUMN WRITE			1	2	3	4	5	6	7	8
		Shoal Creek (C)	Notropis venustus	Hypentelium etowanum	Campostoma anomalum	Lepomis megalotis	Lepomis macrochirus	Micropterus spp.	Carassius auratus	
1	Dec 70		0.25 (1.50)	0.02 (0.27)	0.018 (0.[illegible])	0.12 (0.85)		0.21 (1.18)		
2	Dec 71		0.26 (5.12)	—	—	0.02 (0.25)		0.14 (2.70)		
3	Sept 72		0.01 (0.27)	—	—	—	—			
4		Choccolocco Cr.-Hwy. 9 (C)								
5										
6	Dec 70		1.18 (17.75)	0.04 (2.50)	0.37 (1.17)	0.43 (0.93)	0.71 (14.22)	0.65 (36.00)		
7	Dec 71					—	0.04 (0.67)			
8	Sept 72			—	—	0.03 (1.20)	—			
9		Choccolocco Cr. M.H. Williams Br. (E)								
10	Dec 70						13.16 (2[illegible])	91.43 (119.05)		
11	Dec 71		167.24 (2694.44)				18.75 (150.00)		490.00 (4900.00)	
12	Sept 72						3.18 (61.43)		26.00 (433.33)	
13		Choccolocco Cr. Hwy. 93								
14	Dec 70		50.00 (125.00)		16.85 (121.09)					
15	Dec 71		296.33 (11875.00)		—	15.00 (500.00)	8.50 (170.00)	3.15 (49.22)		
16	Sept 72		6.39 (127.78)		1.61 (46.25)	3.10 (64.29)				
17		Choccolocco Cr. Hwy 77 (E)								
18	Dec 70		65.00 (478.10)			2.86 (150.00)	4.17 (125.0)			
19	Dec 71		13.50 (112.50)			30.36 (455.36)	14.06 (225.00)	10.47 (150.00)		
20	Sept 72					5.47 (181.25)	1.70 (56.67)	2.71 (66.67)		
21		Mouth of Clear Creek (E)								
22	Dec 70		1.44 (9.50)			0.36 (12.75)	0.45 (6.00)	0.65 (27.00)		
23	Dec 71	MONS 044314	9.29 (30.00)			0.19 (4.50)	0.56 (16.67)	0.44 (8.33)		
24	Sept 72		0.30 (10.71)			0.13 (5.86)	0.34 (14.38)	0.18 (6.00)		
25										

Work Sheet #2

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Month to Month Comparison for June, 1972 & September, 1972
A-1254 wet weight only.

COLUMN WRITE		H. etowanum	N. venustus	C. anomalum	L. megalotis	L. macrochirus	Micropterus spp.	Percina caprodes	C. auratus	Dor. cepe
1	Shoal - June '72	—	0.07	—	0.04	—	—	0.03		
2	- Sept '72	—	0.01	—	—	—				
3	Choc - June '72	0.08			0.08	0.06	0.08			
4	Hwy 9 - Sept '72	—			0.03	—				
5	M.H. - June '72	25.0			19.90	12.07			241.67	
6	Williams - Sept '72					3.18			26.00	
7	Hwy 93 - June '72		12.0	2.29		6.60				
8	- Sept. '72		6.39	1.61						
9	Hwy 77 - June '72				9.07	8.67				6.08
10	Sept. '72				5.47	1.70				8.40
11	Stemley June '72				3.27	5.00	6.93			
12	Sept. '72				0.95	0.15	0.24			
13	Clear Creek June '72		6.72		0.64	1.38	0.13			
14	Sept. '72		0.30		0.13	0.34	0.18			
15										
16										

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May 31 — June 2, 1971

Results are ppm.
Sp number is wet weight.
Number in parenthesis is
Lipid weight.

	Hypentelium etowanum - Ala. Hog Sucker			Compostoma anomalum - Stoneroller			Notropis venustus - Blacktail Shiner		
	A-1242	A-1254	Total PCB	A-1242	A-1254	Total PCB	A-1242	A-1254	Total PCB
1) Shoal Creek	0.32 (16.50)	0.02 (1.00)	0.34 (17.50)	0.06 (1.83)	0.04 (1.10)	0.10 (2.93)	0.02 (0.69)	0.11 (4.44)	0.13 (5.13)
2) Choccolocco Creek, Hwy. 9 Bridge	0.01 (0.58)	0.03 (1.46)	0.04 (2.04)	0.04 (0.96)	0.01 (0.25)	0.05 (1.21)	0.06 (1.30)	0.14 (3.30)	0.20 (4.60)
3) Choccolocco Creek, Martha H. Williams Bridge, Hwy. 95							3.10 (40.90)	7.76 (102.20)	10.86 (143.16)
4) Choccolocco Creek, Hwy. 93 Bridge							9.64 (308.33)	11.72 (375.00)	21.36 (683.33)
5) Choccolocco Creek, Hwy. 77							2.86 (40.00)	2.50 (35.00)	5.36 (75.00)
6) Cheaha Creek	0.07 (0.85)	0.10 (1.15)	0.17 (2.00)	—	0.04 (0.32)	0.04 (0.32)	0.74 (20.83)	2.18 (61.67)	2.92 (82.50)
7) Aker's Creek	—	—	None Found				—	0.14 (3.75)	0.14 (3.75)
8) Cane Creek				0.18 (1.41)	0.25 (1.94)	0.43 (3.35)	0.03 (0.43)	0.11 (2.27)	0.14 (2.70)
9) Stemley Bridge, Hwy. 34									
10) Clear Creek									

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Lepomis megalotis - Longear Sunfish			Lepomis macrochirus - Bluegill			Micropterus - salmoides - punctulatus Bass - coosae			Percina caprodes - Logperch		
A-1242	A-1254	Total PCB	A-1242	A-1254	Total PCB	A-1242	A-1254	Total PCB	A-1242	A-1254	Total PCB
0.03 (0.90)	0.03 (0.77)	0.06 1.67	—	—	None Found	(Coosae) 0.03 (1.30)	0.02 (0.90)	0.05 (2.20)			
0.03 (0.77)	0.07 (2.06)	0.10 (2.83)	—	0.02 (0.75)	0.02 (0.75)				—	0.17 (2.25)	0.17 (2.25)
			2.63 (50.00)	8.16 (155.00)	10.79 (205.00)						
			1.44 (95.00)	2.05 (135.00)	3.49 (230.00)						
3.82 (86.67)	4.63 (105.00)	8.45 (191.67)	1.94 (55.00)	5.65 (160.00)	7.59 (215.00)						
—	2.20 (63.75)	2.20 (63.75)	3.54 (48.75)	8.00 (110.00)	11.54 (158.75)	(Coosae) —	0.07 (1.83)	0.07 (1.83)			
—	—	None Found	—	0.01 (0.33)	0.01 (0.33)	(Coosae) —	—	None Found	—	0.33 (2.88)	0.33 (2.88)
						(Salmoides) —	0.01 (0.29)	0.01 (0.29)			
—	0.04 (0.75)	0.04 (0.75)	—	0.14 (4.67)	0.14 (4.67)	(Salmoides) —	0.03 (2.00)	0.03 (2.00)	0.09 (1.70)	0.27 (4.90)	0.36 (6.60)
—	0.62 (14.23)	0.62 (14.23)	—	2.50 (54.17)	2.50 (54.17)	(Punctulatus) 0.20 (4.25)	0.50 (10.75)	0.70 (15.00)			
—	0.43 (10.57)	0.43 (10.57)	0.44 (9.00)	0.73 (15.00)	1.17 (24.00)	(Punctulatus) —	—	None Found			
						(Salmoides) 0.31 (7.50)	0.66 (15.83)	0.97 (23.33)			