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AN EPIDEMIC OF BACTERIAL GILL DISEASE AT  
ODEN HATCHERY AND ITS TREATMENT

by

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A mortality among yearling brook trout at Oden Hatchery was investigated on January 6, 1944. At that time it was determined that gill trouble was causing the mortality but no organisms were found that might have been responsible. Many of the fish supported small growths of fungus on the gills and a dip in Malachite green, 1/10,000 for two minutes, was recommended. This treatment proved ineffectual and another examination was made on January 17, 18, 19, 1944, at which time bacterial gill disease was found to be the cause of the mortality.

The raceways at Oden hatchery are in two parallel series. The raceways containing the diseased fish were #19, #20, #21 and #22; #19 drains into #21; #20 drains into #22. #19 contained lake trout fingerlings and all others brook trout. The mortality among brook trout began in #21, moved across to #22 and then upstream to #20. Trout in #23 and #24, which are directly below #21 and #22, appeared to be normal and no loss was noted. The loss among the lake trout in #19 had been high for several months, but the hatchery crew believed it to be a normal loss because of past experience at that station. However, examination of the lake trout revealed advance stages of bacterial gill disease with typical fusing of the gill filaments. Since raceway #21 is directly below #19, this explained

why the loss among brook trout began in #21 first. The disease was probably transferred across to #22 and upstream to #20 by implements used to clean the screens of these raceways.

No fusion of the gill filaments was found in the brook trout, indicating that the disease was in an early stage. Mucus covered each filament and the gills appeared deep red due to congestion of blood in them. The causative bacteria were found when stained smears from the surface of the gills were examined under the microscope. The coating of mucus prevented adequate exchange of gases and the trout were gradually asphyxiated.

The following are loss records for the trout involved:

Month	Lake trout	Brook trout		
	#19	#20	#21	#22
June	40	Normal		
July	170			
August	180	Loss		
September	300			
October	556	6	6	8
November	424	16	6	14
December	725	40	245	169

Daily loss of lake trout during November.  
Pond #19.

1.	19	16.	16
2.	8	17.	10
3.	12	18.	11
4.	5	19.	4
5.	6	20.	13
6.	7	21.	21
7.	16	22.	13
8.	11	23.	31
9.	16	24.	24
10.	34	25.	12
11.	4	26.	10
12.	4	27.	37
13.	3	28.	13
14.	6	29.	16
15.	4	30.	29
		31.	28
		Total	424

Daily Loss:

December, 1943						January, 1944					
Day	Temp.	#19	#20	#21	#22	Day	Temp.	#19	#20	#21	#22
1		11	0	0	0	1		23	3	11	12
2		7	0	0	1	2		51	3	7	19
3		6	0	1	3	3	37	52	0	10	14
4		8	0	0	0	4		32	1	8	9
5		7	0	12	2	5		39	4	8	6
6		24	1	4	0	6		34	3	10	10
7		19	1	1	2	7	34	14	2	9	16
8		19	0	2	0	8		24	4	9	9
9		8	0	3	2	9		29	7	22	18
10		7	0	7	5	10		52	4	15	18
11		8	1	3	3	11		38	4	60 <sup>2</sup>	13
12		14	0	6	4	12	37	18	5	18	14
13		37	0	6	4	13		19	9	8	5
14		18	0	3	2	14		33	25 <sup>1</sup>	10	12
15		13	0	5	2	15		21	8	10	14
16		52	0	8	10	16		46	2	48 <sup>3</sup>	15
17	41	35	0	5	2	17		85	4	13	39 <sup>2</sup>
18		23	1	8	5	18			7	4	17
19		18	2	8	4	19					
20	38	64	0	7	4	20		530*	55*	20*	28*
21		19	2	5	9	21		78	16	30	3
22		20	2	6	2	22		22	2	12	10
23	36	22	3	6	9	23		16	7	3	6
24		14	3	4	12	24		6	5	4	6
25		20	3	24	15	25		4	7	9	8
26		36	5	16	10	26		1	3	11	8
27	38	77	1	20	8						
28		22	1	50**	31**						
29	36	42	3	8	5						
30		25	5	9	6						
31		30	6	8	7						
		<u>*725</u>	<u>40</u>	<u>245</u>	<u>169</u>						

↓ Treated with NaCl  
 ↓ " " Malachite Green  
 ↓ " " Acetic Acid

\* Treated with 1/2000 copper sulphate for 1 minute.

\* High variability due to occasional ice cover. All fish not recovered until ice melted; therefore more fish on these days.

\*\* Malchite Green dip.

Comparison of 1940 and 1943 lake trout records

Lake trout - 1940 record				Lake trout - 1943 record			
Month	Fish at beginning	Loss	Per cent	Month	Fish at beginning	Loss	Per cent
July	24,275	8,525	35.1	July	19,120	170	0.8
August*	8,000	333	4.1	August	18,950	180	0.9
September	7,667	101	1.3	September	18,770	300	1.6
October	7,566	56	0.7	October	18,470	556	3.0
November	No record			November	17,914	424	2.3
December	7,510	98	1.3	December	17,940	725	4.1

\* 8,750 planted

In 1940, the per cent of loss was not excessive after the number of fish was reduced from 24,275 to 8,000 by planting. The large difference in the number held from August on (10,000 more in 1943) prevents a valid comparison.

Raceways from #19 and #20 to #23 and #24, the end of the series, were treated with 1/2000 copper sulphate solution and all fish dipped for one minute in a copper sulphate solution of the same strength. The ponds and fish were handled so that no infected fish were put into disinfected ponds until after they were treated. Treatment took place on January 19 and 20, 1944. The lake trout were dipped in a 1/2000 solution of copper sulphate on January 19 and 20. The brook trout were treated only once on January 20. The double treatment of the lake trout apparently reduced the daily loss from an average of more than 20 per day to a loss of one per day five days after treatment. The brook trout were only treated once and the loss abated as follows:

Loss per day before treatment (18 days)			Loss per day after treatment (5 days)		
#20	#21	#22	#20	#21	#22
4.1	10.7	12.3	4.8	7.8	8.2

Although the disease in the brook trout appeared to be in an early stage, it is apparent that treatment for two consecutive days should have been given. Further treatments were recommended to control the disease.

The origin of the disease is obscure and cannot be determined exactly from the loss record of the lake trout. The increasing per cent of loss from month to month seems to indicate, however, that the infection was of long standing.

No reason is known for the bacterial gill disease not showing up in the raceways below the infected ones. The trout in the lower pond undoubtedly would have become infected if the disease in the ponds above had been permitted to continue unchecked.

INSTITUTE FOR FISHERIES RESEARCH

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