Oxytetracycline Medicated Feed Clinical Field Trials - INAD 9332

Year 2000 Annual Summary Report on the Use of Oxytetracycline Medicated Feed in Field Efficacy Trials

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Summary

Oxytetracycline as a feed additive (OTF) was used at 32 state fish hatcheries, 1 tribal hatchery, and 11 private hatcheries during calendar year 2000 to evaluate its efficacy to control mortality caused by bacterial coldwater disease, columnaris, flavobacteriosis, bacterial septicemia, strepococcus, general systemic bacterial infection, gram negative bacteria, gram negative bacterial enteritis, gram negative septicemia, vibriosis, pseudomonas and A. Hydrophila, and withering syndrom caused by Rickettsia-like prokaryote in a variety of salmonid and non-salmonid species. OTF has been approved for use in aquaculture by the U.S. Food and Drug Administration (FDA). However, the current label limits drug use to the control of only specific bacterial diseases of specific fish species at water temperatures not below 48.2^{o} F (9^{o} C). Label guidelines do not permit the use of oxytetracycline for the control of the disease conditions described above. To accommodate the needs of aquaculture and to collect pivotal and ancillary clinical field data on OTF for the control of these diseases, the FDA has authorized the use of this compound under Compassionate Investigational New Animal Drug (INAD) Exemption #9332. In calendar year 2000, OTF was administered under INAD #9332 in 186 disease control/prevention trials and involved approximately 32.9 million fish. Standard treatment regimes included the use of OTF at 2.5 - 3.75 g/100 lbs fish/day for 10 - 21 days; and 10.0 g/100 lbs fish/day for 10 - 15 days. In a few select trials fish were fed oxytetracycline medicated feed at 0.82 - 2.40 g/100 lbs fish/day for 3 - 23 days, 3.80 - 9.20 g/100 lbs fish/day for 10 - 29 days, and 11.25 - 46.0 g/100 lbs fish/day for 14 days. Approximately 63% of trials appeared efficacious, 4% appeared non-efficacious, and 33% were characterized as inconclusive.

Introduction

The current label for OTF use in aquaculture limits use to the control of furunculosis in

salmonids caused by *Aeromonas salmonicida*, and the control of bacterial hemorrhagic septicemia in salmonids and catfish caused by *A. hydrophila* or *Pseudomonas sp.*. Oxytetracycline medicated feed has been shown to be highly effective in controlling these diseases, especially when predisposing environmental stresses are reduced at the time of treatment (Warren 1991). Furthermore, the current FDA approved label for OTF limits dosage to a range of 2.5 - 3.75 grams of active drug per 100 pounds of fish per day for 10 days, and limits use to water temperatures "not below 48.2^{o} F (9^{o} C)". These label restrictions severely limit the overall utility of approved OTF use in aquaculture.

Fish culturists have also reported that OTF treatment is a useful tool for the control of bacterial cold water disease (CWD) and columnaris in salmonids. These two diseases, collectively termed "flavobacteriosis" are caused by *Flavobacter psychrophilus* and *F. columnaris*. Enteric redmouth caused by *Yersinia ruckeri*, vibriosis caused by various members of the genus *Vibrio*, and other less common bacterial diseases of fish also have been found to be responsive to OTF therapy. However, none of these latter uses are approved by the FDA.

Purpose of Report

The primary purpose of this report is to summarize the results of calendar year (CY) 2000 supplemental OTF field efficacy studies. However, it is also expected data from these studies will be used to enhance the existing OTF database that has been established from previous years studies for the purpose of expanding and/or extending the approved label for OTF.

Facilities, Materials, and Treatment Procedures

1. Facilities

A total of 32 state fish hatcheries, 1 tribal hatchery, and 11 private hatcheries (44 total facilities) used OTF to control mortality caused by bacterial coldwater disease (CWD), columnaris, bacterial septicemia, strepococcus, general systemic bacterial infection, gram negative bacteria, gram negative bacterial enteritis, gram negative septicemia, vibriosis, pseudomonas and A. Hydrophila, and Rickettsia -like Prokaryote (RLP).

2. OTF used in trials

The OTF used in these trials was either Terramycin 100 or Terramycin 100D, both of which contained 100 g active oxytetracycline quaternary salt per pound of premix. All Terramycin 100/100D was supplied by Pfizer, Inc., 1107 South 291 Highway, Lee's Summit, MO. However, oxytetracycline medicated feed was supplied by several different fish feed manufacturers.

3. Drug dosages and duration

As described in the Study Protocol for INAD #9332, Investigators were allowed to use OTF either within the current label range of 2.5 - 3.75 grams of active drug per 100 lbs of fish per day for 10 - 21 days (~42% of trials), or at 10.0 grams of active drug per 100 lbs of fish per day for 10 - 15 days (~14% of trials). However, a number of trials (~44%) deviated from the protocol during CY 2000. In these trials, fish were fed at rates of 0.82 - 46.0 grams of active drug per drug/100 lbs fish/day for periods of time ranging from 3 - 29 days.

Fish Species and Fish Diseases Involved in year 2000 Trials

1. Species of fish treated

Seven salmonid species and 12 non-salmonid species were treated during CY 2000. Species treated included rainbow and steelhead trout (*Oncorhynchus mykiss*); coho salmon (*O. kisutch*); chinook salmon (*O. tshawytscha*); sockeye salmon (*O. nerka*), Atlantic salmon (*Salmo salar*), cutthroat trout (*O. clarki*), smallmouth bass (*M. dolomieu*), channel catfish (*Ictalurus punctatus*), white sturgeon (*Acipenser transmontanus*), white seabass (*Atractoscion nobilis*), hybrid striped bass (white bass x striped bass), California halibut (*Paralichthys californicus*), summer flounder (*P. dentatus*), tilapia *(Tilapia mossambica*), yellow bullhead (*Ameiurus natalis*), black bullhead (*A. melas*), muskellunge (*Esox masquinongy*), and red abalone (*Haliotis rufescens*).

2. Diseases treated

The diseases treated most frequently during CY 2000 were bacterial coldwater disease (47% of trials), and strepococcus (14% of trials). Other diseases treated were columnaris, bacterial septicemia, general systemic bacterial infection, gram negative bacteria, gram negative bacterial enteritis, gram negative septicemia, vibriosis, pseudomonas and A. Hydrophila, and RLP.

Data Collected

1. Pathologist's reports

Fish health pathology reports include: 1) a description of how the identity of disease agent(s) was verified; 2) disease identification records that confirm the presence of the disease agent; and 3) the name and title of the individual performing the diagnosis. Additionally, pathology reports often provide documentation that there were no secondary infections or infestations caused by

unrelated disease agents in a population of test fish. Pathology reports provide essential information if efforts are to expand/extend an existing approved label. Approximately 30% of CY 2000 trials included pathologist's reports.

2. Mortality data

As stated in the Study Protocol, mortality data was to be collected 5 days prior to treatment, during the treatment period, and for at least 20 days post-treatment. Investigators were strongly encouraged to collect mortality data on a daily basis. However, daily collection of mortality data was not always possible. At production facilities that are understaffed, the collection and enumeration of mortalities can not always be conducted on a daily basis. Therefore, in some cases, mortalities were collected, counted, and recorded only once/twice per week.

Discussion of Study Results:

1. General observations on the efficacy of OTF for the control of bacterial diseases in salmonid and non-salmonid fish (Note: Table 1 provides a summary of all efficacious trials; Table 2 provides a summary of all non-efficacious trials; Table 3 provides a summary of all inconclusive trials; Table 4 provides summary data for all trials; and Table 5 provides a summary of all trials conducted during CY 2000 under INAD #9332.)

A. Efficacy at 0.82 - 2.40 g/100 lbs fish/day for 3 - 23 days at water temperatures above 48.2^{o} F

OTF was used at 0.82 - 2.40 g/100 lbs of fish for 3 - 23 days in 21 trials (Tables 1 & 3). Trials involved steelhead trout and tilapia diagnosed with CWD, and strepococcus. OTF treatment appeared efficacious in 17 trials, while 4 trials were characterized as inconclusive.

B. Efficacy at 0.82 - 2.40 g/100 lbs fish/day for 10 days at water temperatures below 48.2^{o} F

OTF was used at 0.82 - 2.40 g/100 lbs of fish for 10 days in 1 trial (Table 1). This trial appeared efficacious in controlling mortality caused by CWD in coho salmon.

C. Efficacy at 2.5 - 3.75 g/100 lbs fish/day for 10 - 21 days at water temperatures above 48.2^{o} F

OTF was used at 2.5 - 3.75 g/100 lbs of fish for 10 - 21 days in 71 trials (Tables 1 - 3). Trials involved rainbow trout, California halibut, channel catfish, hybrid striped bass, smallmouth bass, summer flounder, tilapia, white seabass, and white sturgeon diagnosed with CWD, columnaris, bacterial

septicemia, general bacterial infection, gram negative bacteria, gram negative septicemia, strepococcus, and vibriosis. OTF treatment appeared efficacious in 43 trials, while 3 trials appeared to be non-efficacious, and 25 trials were characterized as inconclusive.

D. Efficacy at 2.5 - 3.75 g/100 lbs fish/day for 10 - 14 days at water temperatures below 48.2^{o} F

OTF was used at 2.5 - 3.75 g/100 lbs of fish for 10 - 14 days in 7 trials (Tables 1 - 3). Trials involved steelhead trout, rainbow trout, and cutthroat trout diagnosed with CWD. OTF treatment appeared efficacious in 4 trials, while 1 trial appeared to be non-efficacious, and 2 trials were characterized as inconclusive.

E. Efficacy at 3.80 - 9.20 g/100 lbs fish/day for 10 - 29 days at water temperatures above 48.2^{o} F

OTF was used at 3.80 - 9.20 g/100 lbs of fish for 10 - 29 days in 47 trials (Tables 1 - 3). Trials involved rainbow trout, steelhead trout, Atlantic salmon, channel catfish, hybrid striped bass, tilapia, abalone, muskellunge, and black and yellow bullhead diagnosed with CWD, columnaris, gram negative enteritis, gram negative septicemia, strepococcus, RLP, strepococcus, and pseudomonas and A. hydrophilia. OTF treatment appeared efficacious in 34 trials, while 2 trials appeared to be non-efficacious, and 11 trials were characterized as inconclusive.

F. Efficacy at 3.80 - 9.20 g/100 lbs fish/day for 10 days at water temperatures below 48.2^{o} F

OTF was used at 3.80 - 9.20 g/100 lbs of fish for 10 days in 3 trials (Tables 1 & 3). Trials involved coho salmon, and cutthroat trout diagnosed with CWD. OTF treatment appeared efficacious in 2 trials, while 1 trial was characterized as inconclusive.

G. Efficacy at 10.0g/100lbs fish/day for 10 - 15 days at water temperatures above 48.2^{o}F

OTF was used at 10.0 g/100lbs fish/day for 10 - 15 days in 19 trials (Tables 1 & 3). Trials involved coho salmon, spring chinook salmon, rainbow trout, cutthroat trout, and steelhead trout diagnosed with CWD, and columnaris. OTF treatment appeared efficacious in 12 trials, while 7 trials were characterized as inconclusive.

H. Efficacy at 10.0g/100lbs fish/day for 14 - 15 days at water temperatures below 48.2°F

OTF was used at 10.0 g/100lbs fish/day for 14 - 15 days in 8 trials (Tables 1 - 3). Trials involved coho salmon, chinook salmon, sockeye salmon, and steelhead trout diagnosed with CWD. OTF treatment appeared efficacious in 3 trials, while 2 trials appeared to be non-efficacious, and 3 trials were characterized as inconclusive.

I. Efficacy at 11.25 - 46.0 g/100 lbs fish/day for 14 days at water temperatures above 48.2° F

OTF was used at 11.25 - 46.0 g/100 lbs of fish for 14 days in 8 trials (Tables 1 & 3). Trials involved steelhead trout and cutthroat trout diagnosed with CWD. OTF treatment appeared efficacious in 1 trial, while 7 trials were characterized as inconclusive. The Investigator at Washoe Park Trout Hatchery noted that the dosage levels appeared higher than allowed due to feeding "by eye" and the nature of feeding "swim-up" fry (e.g. inefficient feeding, poor conversion, wide confidence intervals of size, lot weight, etc.).

J. Efficacy at 11.25 - 46.0 g/100 lbs fish/day for 14 days at water temperatures below 48.2° F

OTF was used at 11.25 - 46.0 g/100 lbs of fish for 14 days in 1 trial (Table 3). This trial was characterized as inconclusive in controlling mortality caused by CWD in cutthroat trout. The Investigator at Washoe Park Trout Hatchery noted that the dosage levels appeared higher than allowed due to feeding "by eye" and the nature of feeding "swim-up" fry (e.g. inefficient feeding, poor conversion, wide confidence intervals of size, lot weight, etc.).

2. Observed Toxicity

No toxicity or adverse effects relating to OTF treatment were reported.

Summary of Study Results

Oxytetracycline medicated feed was used at dosages ranging from 0.82 - 46.0 g/100lbs fish per day. Treatment duration ranged from 3 - 29 days. Eighteen different species of fish and one species of abalone were treated with OTF, and trials involved approximately 32.9 million fish. Treated fish ranged in size from 0.75 - 14.6 in. Water temperature during treatment ranged from 37.3 - 87.8 °F, with a mean treatment temperature of 63.3 °F. Approximately 63% of trials appeared efficacious, while 4% appeared non-efficacious, and 33% were characterized as inconclusive. Twelve trials

involved the use of control fish and ~30% of trials included pathologist's reports. Overall, OTF appeared effective in controlling mortality caused by bacterial coldwater disease. Results of trials indicated that mortality decreased during or following the treatment period, and remained at normal levels throughout the post-treatment period. Furthermore, investigators reported no evidence of toxicity or adverse effects related to OTF treatment. However, based on a general lack of untreated control fish, replication, randomization, etc., it is understood that these data can only be considered as ancillary data. None-the-less, the ancillary data described above should provide useful corroborative data to support a future expanded label claim for OTF. It is anticipated that additional ancillary efficacy data will continue to be collected under INAD #9332. In future trials conducted under INAD #9332, efforts will be directed towards the generation of higher quality data.

References

Warren, J.W. 1991. Diseases of hatchery fish. U.S. Fish and Wildlife Service, Portland, Oregon, 92 p.

Table 1. Summary of CY 2000 Oxytetracycline Medicated Feed Efficacy Results - Efficacious Trials

Hatchery	Number of Trials	Fish Species	Fish Size (inches)	Number of Fish	Disease	Number of Treatment Days	Dose (g/100 lbs)	Temp. (ºF)
Solomon Gulch Hatchery	1	COS	3.20	1,843,857	CWD	10	0.82 - 2.40	38.0
Magic Valley Steelhead Hatchery	1	STT	2.50	276,000	CWD	10	0.82 - 2.40	58.0
Simaron Fresh Water Fish Inc.	3	TIA	6.3 - 8.4	148,000	Strepococcus	14 - 18	0.82 - 2.40	73.4 - 78.8
	13	TIA	10.0 - 14.6	298,134	Strepococcus	14 - 23	0.82 - 2.40	75.2 - 82.4
Las Animas SFH	1	CCF	3.50	96,298	Bacterial Septicemia	10	2.50 - 3.75	54.0
Washoe Park Trout Hatchery	1	CUT	4.60	11,900	CWD	10	2.50 - 3.75	44.5
American Falls Hatchery	5	RBT	3.8 - 7.8	97,730	CWD	10	2.50 - 3.75	55.0
Bellvue SFH	3	RBT	3.3 - 4.3	155,880	CWD	10	2.50 - 3.75	54.0 - 55.0
	1	RBT	2.52	207,000	Columnaris	10	2.50 - 3.75	54.5
Finger Rock Rearing Unit	1	RBT	3.68	120,000	CWD	10	2.50 - 3.75	46.0
Hagerman Fish Hatchery	5	RBT	1.7 - 3.9	1,383,990	CWD	10	2.50 - 3.75	59.0
	2	RBT	5.0 - 5.2	298,042	CWD	10	2.50 - 3.75	59.0
	1	RBT	8.40	74,600	Columnaris	10	2.50 - 3.75	59.0
Mt. Ouray SFH	1	RBT	1.60	423,999	CWD	10	2.50 - 3.75	48.0
Nampa Fish Hatchery	2	RBT	3.9 - 4.7	250,588	CWD	10	2.50 - 3.75	59.0
Rifle Falls SFH	6	RBT	1.6 - 3.1	458,144	CWD	10 - 20	2.50 - 3.75	58.0

Table 1. Summary of CY 2000 Oxytetracycline Medicated Feed Efficacy Results - Efficacious Trials - cont.

Hatchery	Number of Trials	Fish Species	Fish Size (inches)	Number of Fish	Disease	Number of Treatment Days	Dose (g/100 lbs)	Temp. (ºF)
Roaring Judy SFH	1	RBT	4.15	387,551	CWD	10	2.50 - 3.75	44.4
Kent SeaTech Corp.	1	SXW	6.00	49,118	Gram Negative Septicemia	10	2.50 - 3.75	57.2
	1	SXW	13.00	215,130	Gram Negative Septicemia	10	2.50 - 3.75	57.2
Simaron Fresh Water Fish Inc.	2	TIA	7.6 - 8.2	45,000	Strepococcus	12 - 13	2.50 - 3.75	80.6 - 82.4
	1	TIA	13.10	19,500	Strepococcus	21	2.50 - 3.75	80.6
Hubbs Seaworld Research Institute	1	WSB	5.00	2,000	Gram Negative Bacteria	10	2.50 - 3.75	62.0
Stolt Sea Farm California, LLC	7	WHS	4.0 - 7.3	14,725	General Systemic Bacterial Infection	10	2.50 - 3.75	68.0 - 70.0
	4	WHS	8.3 - 12.0	1,950	General Systemic Bacterial Infection	10	2.50 - 3.75	70.0
The Abalone Farm, Inc.	3	ABL	2.7 - 3.0	100,582	Withering Syndrome	14	3.80 - 9.20	60.0 - 60.7
Blind Pony Fish Hatchery	1	BYB	5.00	75,570	Columnaris	10	3.80 - 9.20	70.0
	1	CCF	5.00	135,535	Columnaris	10	3.80 - 9.20	70.0
Rathbun Fish Hatchery/Research Facility	1	CCF	4.15	425,169	Columnaris	10	3.80 - 9.20	81.0
McCall Fish Hatchery	1	CUT	1.40	95,225	CWD	10	3.80 - 9.20	48.1

Table 1. Summary of CY 2000 Oxytetracycline Medicated Feed Efficacy Results - Efficacious Trials - cont.

Hatchery	Number of Trials	Fish Species	Fish Size (inches)	Number of Fish	Disease	Number of Treatment Days	Dose (g/100 lbs)	Temp. (°F)
Washoe Park Trout Hatchery	1	CUT	3.17	73,000	CWD	10	3.80 - 9.20	44.5
Chalk Cliffs Rearing Unit	1	RBT	4.50	600,000	Pseudomonas & A. Hydrophila	10	3.80 - 9.20	54.5
Mt. Ouray SFH	1	RBT	2.00	302,700	CWD	21	3.80 - 9.20	50.0
Kent Sea Tech Corp.	7	SXW	3.00	1,361,457	Gram Negative Bacterial Enteritis	10	3.80 - 9.20	78.8
	17	SXW	7.5 - 10.5	603,352	Gram Negative Septicemia	10	3.80 - 9.20	67.3 - 79.2
Simaron Fresh Water Fish Inc.	2	TIA	6.3 - 7.4	64,100	Strepococcus	10 - 29	3.80 - 9.20	77.0 - 78.8
Big Creek Hatchery	2	COS	2.60	1,170,000	CWD	10 - 14	10.0	49.5
Burnett Inlet Hatchery	1	COS	4.55	262,150	CWD	14	10.0	45.0
Sandy Hatchery	1	COS	2.50	68,442	CWD	15	10.0	51.2
Murray Springs Trout Hatchery	5	CUT	1.0 - 2.3	374,000	CWD	14 - 15	10.0	52.0
Giant Springs Trout Hatchery	1	RBT	2.80	81,385	CWD	14	10.0	54.0
Murray Springs Trout Hatchery	2	RBT	1.00	42,000	CWD	14	10.0	52.0

Table 1. Summary of CY 2000 Oxytetracycline Medicated Feed Efficacy Results - Efficacious Trials - cont.

Hatchery	Number of Trials	Fish Species	Fish Size (inches)	Number of Fish	Disease	Number of Treatment Days	Dose (g/100 lbs)	Temp. (ºF)
Dexter Ponds	1	SCS	6.30	467,250	Columnaris	14	10.0	60.0
Burnett Inlet Hatchery	2	SOS	4.6 - 1.7	819,292	CWD	14	10.0	45.0
Murray Springs Trout Hatchery	1	CUT	1.00	40,000	CWD	14	11.25 - 46.0	52.0

Table 2. Summary of CY 2000 Oxytetracycline Medicated Feed Efficacy Results - Non-efficacious Trials

Hatchery	Number of Trials	Fish Species	Fish Size (inches)	Number of Fish	Disease	Number of Treatment Days	Dose (g/100 lbs)	Temp. (ºF)
Rifle Falls SFH	2	RBT	1.9 - 3.2	134,000	CWD	10 - 21	2.50 - 3.75	58.0
Big Creek Hatchery	1	STT	1.10	215,600	CWD	10	2.50 - 3.75	48.0
GreatBay Aquafarms, Inc	1	SFL	4.33	31,500	Vibriosis	10	2.50 - 3.75	66.2
Pitkin SFH	1	RBT	2.24	308,280	CWD	10	3.80 - 9.20	51.0
Kent SeaTech Corp.	1	SXW	9.00	26,081	Gram Negative Septicemia	10	3.80 - 9.20	76.1
Cascade Hatchery	2	COS	1.8 - 2.1	9,848,252	CWD	14	10.0	45.0

Table 3. Summary of CY 2000 Oxytetracycline Medicated Feed Efficacy Results - Inconclusive Trials

Hatchery	Number of Trials	Fish Species	Fish Size (inches)	Number of Fish	Disease	Number of treatment days	Dose (g/100 lbs)	Temp. (ºF)
Magic Valley Steelhead Hatchery	1	STT	2.78	145,000	CWD	14	0.82 - 2.40	58.0
Simaron Fresh Water Fish Inc.	2	TIA	5.86	219,000	Strepococcus	13	0.82 - 2.40	82.4 - 87.8
	1	TIA	14.5	12,000	Strepococcus	3 - 13	0.82 - 2.40	80.6
Rathbun Fish Research Hatchery/Research Facility	1	CCF	4.65	223,179	Columnaris	10	2.50 - 3.75	79.0
Hubbs Seaworld Research Institute	1	HAL	4.00	4,500	Gram Negative Bacteria	10	2.50 - 3.75	65.5
Clearwater Hatchery	1	RBT	5.58	313,156	CWD	10	2.50 - 3.75	57.0
Durango SFH	1	RBT	2.30	235,002	CWD	10	2.50 - 3.75	50.0
Glenwood Springs SFH	1	RBT	2.01	18,184	CWD	10	2.50 - 3.75	48.0
Hagerman Fish Hatchery	3	RBT	1.9 - 2.8	706,505	CWD	10	2.50 - 3.75	59.0
	3	RBT	5.1 - 9.8	174,000	CWD	10	2.50 - 3.75	59.0
Mt. Shavano SFH	1	RBT	2.50	257,300	CWD	10	2.50 - 3.75	50.0
Rifle Falls SFH	3	RBT	1.9 - 3.2	148,485	CWD	10 - 11	2.50 - 3.75	58.0
Wray SFH	1	SMB	1.37	159,583	Columnaris	10	2.50 - 3.75	74.0
Big Creek Hatchery	1	STT	1.10	215,600	CWD	14	2.50 - 3.75	48.0

Table 3. Summary of CY 2000 Oxytetracycline Medicated Feed Efficacy Results - Inconclusive Trials-cont.

Hatchery	Number of Trials	Fish Species	Fish Size (inches)	Number of Fish	Disease	Number of treatment days	Dose (g/100 lbs)	Temp. (ºF)
Simaron Fresh Water Fish Inc.	1	TIA	8.18	20,000	Strepococcus	14	2.50 - 3.75	78.8
Hubbs Seaworld Research Institute	2	WSB	3.75	21,818	Gram Negative Bacteria	10	2.50 - 3.75	66.7 - 69.8
Stolt Sea Farm California LLC	3	WHS	3.00	7,400	General Systemic Bacterial Infection	10	2.50 - 3.75	70.0
	4	WHS	6.6 - 9.5	2,000	General Systemic Bacterial Infection	10	2.50 - 3.75	70.0
The Abalone Farm	1	ABL	3.70	195	Withering Syndrome	14	3.80 - 9.20	59.9
Atlantic Salmon of Maine	1	ATS	4.86	31,600	Columnaris	15	3.80 - 9.20	66.0
Blind Pony Fish Hatchery	1	BYB	11.00	24,446	Columnaris	10	3.80 - 9.20	70.0
Rathbun Fish Research Hatchery/Research Facility	1	CCF	1.50	350,405	Columnaris	10	3.80 - 9.20	79.0
Sheep Creek Hatchery	1	COS	3.80	289,328	CWD	10	3.80 - 9.20	37.3
Lost Valley Fish Hatchery	1	MUE	6.20	8,000	Columnaris	10	3.80 - 9.20	73.0
Chalk Cliffs Rearing Unit	1	RBT	9.70	150,000	pseudomonas & A. hydrophila	10	3.80 - 9.20	51.0

Table 3. Summary of CY 2000 Oxytetracycline Medicated Feed Efficacy Results - Inconclusive Trials-cont.

Hatchery	Number of Trials	Fish Species	Fish Size (inches)	Number of Fish	Disease	Number of treatment days	Dose (g/100 lbs)	Temp. (ºF)
Fillmore Hatchery	1	RBT	4.00	283,000	Columnaris	10	3.80 - 9.20	60.0
Bonneville Hatchery	1	STT	2.95	158,488	CWD	14	3.80 - 9.20	50.0
Kent SeaTech Corp.	1	SXW	3.00	261,650	Gram Negative Bacterial Enteritis	10	3.80 - 9.20	78.8
	1	SXW	9.00	6,962	Gram Negative Septicemia	10	3.80 - 9.20	76.1
Simaron Fresh Water Fish Inc.	1	TIA	8.18	14,000	Strepococcus	15	3.80 - 9.20	80.6
Whitman Lake Hatchery	1	CKS	1.80	949,200	CWD	14	10.0	40.6
Keta Creek Hatchery	1	COS	1.70	560,000	CWD	14	10.0	47.0
Murray Springs Trout Hatchery	3	CUT	1.3 - 1.8	169,000	CWD	14 - 15	10.0	52.0
	1	RBT	2.22	28,000	CWD	14	10.0	52.0
Big Creek Hatchery	1	STT	1.10	210,900	CWD	15	10.0	48.0
Clearwater Hatchery	1	STT	4.00	699,644	CWD	14	10.0	53.0
Mad River Hatchery	2	STT	1.5 - 2.0	327,590	CWD	14	10.0	52.0 - 54.0
Washoe Park Trout Hatchery	7	CUT	0.75 - 2.9	258,600	CWD	14	11.25 - 46.0	45.0 - 56.0
Oak Springs Hatchery	1	STT	1.50	655,000	CWD	14	11.25 - 46.0	53.0

Table 4. Summary Data Regarding CY 2000 Oxytetracycline Medicated Feed Efficacy Trials

Total Fish Treated:	**32,922,778**
Number of fish treated in efficacious trials	14,040,345
Number of fish treated in non-efficacious trials	10,563,713
Number of fish treated in inconclusive trials	8,318,720
Total number of trials:	**186**
Efficacious trials	117
Non-efficacious trials	8
Inconclusive trials	61

Trials that Included Control Fish:

Study Number: 9332-2K-026; 9332-2K-045; 9332-2K-065; 9332-2K-100; 9332-2K-107; 9332-99-115; 9332-2K-118; 9332-2K-132; 9332-2K-162; 9332-2K-164; 9332-2K-166; and 9332-2K-168

Treatment Regimes Used:

0.82 - 2.40 g/100 lbs fish/day for 3 - 23 days (above 48.2°F)	21 trials
0.82 - 2.40 g/100 lbs fish/day for 10 days (below 48.2°F)	1 trial
2.5 - 3.75 g/100 lbs fish/day for 10 - 21 days (above 48.2°F)	71 trials
2.5 - 3.75 g/100 lbs fish/day for 10 - 14 days (below 48.2°F)	7 trials
3.80 - 9.20 g/100 lbs fish/day for 10 - 29 days (above 48.2°F)	47 trials
3.80 - 9.20 g/100 lbs fish/day for 10 days (below 48.2°F)	3 trials
10.0 g/100 lbs fish/day for 10 - 15 days (above 48.2°F)	19 trials
10.0 g/100 lbs fish/day for 14 - 15 days (below 48.2°F)	8 trials
10.7 - 46.0 g/100 lbs fish/day for 14 days (above 48.2°F)	8 trials
10.7 - 46.0 g/100 lbs fish/day for 14 days (below 48.2°F)	1 trial

Treatment Water Temperature (°F):

Temperature Range	37.3 - 87.8
Mean Temperature	63.3

Size of Treated Fish (in.):

Size Range	0.75 - 14.60

Species Treated:

rainbow and steelhead trout (*Oncorhynchus mykiss*)
chinook salmon (*O. tshawytscha*)
Atlantic salmon (*Salmo salar*)
smallmouth bass (*M. dolomieu*)
white sturgeon (*Acipenser transmontanus*)
hybrid striped bass (white bass x striped bass)
tilapia *(Tilapia mossambica*)
black bullhead (*A. melas*)
California halibut (*Paralichthys californicus*)
coho salmon (*O. kisutch*)
sockeye salmon (*O. nerka*)
cutthroat trout (*O. clarki*)
channel catfish (*Ictalurus punctatus*)
white seabass (*Atractoscion nobilis*)
summer flounder (*P. dentatus*)
yellow bullhead (*Ameiurus natalis*)
muskellunge (*Esox masquinongy*)
red abalone (*Haliotis rufescens*)