

MONTANA FISH AND GAME DEPARTMENT

FISH DIVISION

JOB COMPLETION REPORT

29-L-0: Hatchery Biologist Activities

Period: May 1, 1957 - April 30, 1958

Diagnosis of Hatchery and Wild Trout Diseases

Vitamin assay of the New Age brand pellet by George Post of Wyoming revealed a thiamin deficiency in at least one batch of the New Age pellet. A thiamin deficiency was therefore suspected among one lot of rainbow trout on the New Age brand pellet at Great Falls when the fish became nervous and a slight increase in mortality rate developed. Fresh visceral meat supplement was recommended and hatcherymen were instructed to watch for further symptoms.

A rainbow trout from Meadow Lake near Ennis was sent in by a fisherman in August, 1957 for examination. A diplo-bacillus morphologically resembling furunculosis was found in the furunculosis-like lesions.

A smoked rocky mountain whitefish was submitted April, 1958 for examination of yellowish pinhead size pustules in the musculature of the caudal peduncle. The fish was caught from Rock Creek in Granite County by a fisherman. The pustule contained thousands of the myxosporidian, Henneguya.

A die-off of carp in Canyon Ferry Reservoir was investigated in mid-January. The dead carp were mostly 1- to 3-year-olds. Mucous and inflammation particularly around the nose and gills suggest "cold-injury" as the probable cause of death. According to Schaperclaus' Textbook of Pond Culture this disease kills young carp wherever water temperatures drop below 4°C. Such a condition could easily occur in Canyon Ferry Reservoir during winter cold snaps.

The brood stock pond at Arlee was treated with sodium arsenite in an attempt to rid it of aquatic weeds, mainly Anacharis occidentalis. Manufacturers recommendations were followed for treatment dilution and application. All trout in the pond died presumably due to oxygen depletion. The weed kill was not complete in all parts of the pond and the treatment was judged unsuccessful as a practical means of controlling weeds in that particular pond.

Big Timber hatchery personnel were given technical assistance in calculations for chlorine sterilization of some outside ponds.

Development of a Pellet Fish Feed

Feeding trials over extended periods with pellets containing only four ingredients; cottonseed meal, wheat middlings, fish meal, and distiller's solubles were successful as far as growth rate and conversion was concerned. Vitamin deficiencies, however, resulted in a low vitality of the fish. After an extensive review of the literature on animal feeding and trout nutrition a new pellet formula was recommended utilizing the same four ingredients as the major sources of protein. The new pellet was

milled to contract specifications by Teslow Mills in Bozeman and contains the following ingredients:

Cottonseed meal (43% protein).....	20%
Wheat middlings.....	20
Fish meal (Canadian herring).....	21
Distiller's solubles (dried corn sol.).....	15
Dried skimmilk.....	10
Brewer's yeast.....	8
A & D feeding oil.....	2
Molasses.....	2
Alfalfa meal.....	2

A vitamin premix is added at the rate of 10 pounds per ton to give the following analysis per 100 pounds of the finished feed:

Riboflavin.....	500 mgs
Pyridoxine.....	160 mgs
Niacin.....	2000 mgs
Pantothenic acid.....	5000 mgs
Vitamin E (20,000 u/g).....	4000 mgs

Vitamin assays on the four-ingredient pellet and on the new pellet formula showed thiamine deficiency in both, riboflavine adequate only in the new pellet, pyridoxine adequate in both, niacin adequate in both, pantothenic acid adequate only in the new pellet, biotin and folic acid inadequate in both.

Correspondence is now being carried on with suppliers of the vitamin premix to attempt to overcome the thiamine deficiency which is probably severe enough to cause deficiency symptoms after prolonged feeding with the straight pellet. A revised premix will probably be specified as follows:-- to be added at the rate of 10 pounds per ton to give the following analysis per 100 pounds of the finished feed:

Thiamine.....	500 mgs
Riboflavine.....	500 mgs
Pantothenic acid.....	4000 mgs
Biotin.....	100 mgs
Folic acid.....	500 mgs
Vitamin E (200,000 u/g).....	4000 mgs

Cost of the fortified pellet was 9.7 cents per pound. Cost of the changed vitamin premix is not yet known and final recommendations for the premix will be made after cost data is obtained.

Feeding trials with the new pellet have been successful after approximately three months continuous use but fish-culturists are cautioned to watch for thiamine deficiency symptoms which can be corrected with fresh visceral meat supplements.

Annual Reports

Hatchery foremen were assisted in the preparation of annual hatchery reports. All reports were reviewed and forwarded to Helena. An analysis of production data was tabulated for future use in making decisions involving changes in the trout rearing program.

Production Coordination

Requests for technical assistance from the hatchery biologist in making fish transfers are mainly concerned with the so-called fostering plan.

Growth rate predictions based on feeding tables and expected conversions are used to time the transfer of rainbow trout from warm water stations to cold water stations for the catchable fish planting commitments.

The requests are reviewed with the following requirements in mind:

1. Predicted growth rates are used to insure proper planting size (7 to 9 inches for catchable-size fish) at the proper time.
2. Portland office approval in Fish and Wildlife Service transfers.
3. Approval of species and size at planting by Holton, Keller, or the District Fishery Manager to insure that the fish are to be used in accordance with the planting policy in the hatchery area to which they are being transferred.
4. Final approval for the transfer is made on a form which must be signed by the Chief Fisheries Management Biologist and the Superintendent of Fisheries.

The following transfers of fish to be used in the 1958 planting season were recorded in the Hatchery Biologist's office:

Rb-40-57	51,205 at 245/lb	Bluewater to Anaconda	September 12, 1957
Rb-40-57	19,146 at 137 to 113/lb	Bluewater to Lewistown	September 28, 1957
Rb	200,000 at 300-400/lb	Bozeman to Anaconda	April, 1957
Rb-57	35,000 at 4.2/lb	Ennis to Hamilton	February, 1958
Rb-Oreg.-57	50,000 at 420/lb	Ennis to Arlee	April, 1957
Rb-40-57	23,400 at 9.5-10/lb	Bluewater to Big Timber	Feb. 11-18, 1958
Rb-40-57	30,000 at 8.9-9.4/lb	Bluewater to Emigrant	Feb. 13-24, 1958
Ct	7,399 at 12/lb	Ennis to Emigrant	Feb., 1958
Ct	Brood stock	Creston to Anaconda	April, 1957

Monthly Production and Distribution Records

Each month the second and third copies of hatchery production and distribution records are sent to the hatchery biologist. They are reviewed for possible errors or omissions and notations are made on the forms concerning recommended feed levels, expected growth rates, and expected conversions. The third copy is returned to the hatchery foreman who forwards it to the Superintendent of Hatcheries after transferring notes or corrections to the original copy. It is intended that hatchery foremen be kept aware

of the need to improve conversions and growth rates by proper feeding techniques with good diets. The end result is a lower food cost per pound for the fish produced.

Hatchery Manual

Each year a significant addition is to be made to the hatchery manual. In 1957, a revision to the section on blue-sac disease of trout fry was added when significant contributions to the knowledge of the disease were published by Dr. Ken Wolf of the Fish and Wildlife Service.

Tables containing measurements of rearing space, water temperatures, water quality, and volume of flow were added to the station copies. The tables are mainly of value in chemical treatments of fish in the rearing units.

Submitted by: Jack E. Bailey /s/
Hatchery Biologist

Date April 29, 1958