

TROUT FISHING IN THE TROPICS¹

RAINBOW TROUT IN THE RÍO CHIRIQUÍ VIEJO, PANAMA

By SAMUEL F. HILDEBRAND, D. Sc.

Senior Ichthyologist, Bureau of Fisheries, United States Department of Commerce

REPORTS giving glowing accounts of a very successful introduction of rainbow trout in the upper course of the Río Chiriquí Viejo, situated in extreme southwestern Panama, have reached the United States Bureau of Fisheries during recent years. It seemed desirable, therefore, to obtain first hand information concerning the ecological conditions prevailing in this stream that brought about the excellent results. Such information would serve as a guide in determining the fitness for the support of trout of other streams within tropical America.

Americans have been attracted to the uplands of the Province of Chiriquí for some years by the cool pleasant climate in contrast with the warm humid atmosphere of the Canal Zone, as well as by the fertile land. The American settlers and property owners were successful in about 1924 in interesting the American minister to Panama in the possibility of establishing trout in the streams of the vicinity.

Upon the request of the American minister, through diplomatic channels, the United States Commissioner of Fisheries detailed Fred J. Foster, an expert fish culturist, to make an inspection of the Río Chiriquí Viejo to determine if the conditions were suitable for trout. Mr. Foster found the temperature sufficiently low above an elevation of about 4,000 to 4,500 feet, and the stream in other respects also seemed suitable. Thereupon, he recommended the introduction of rainbow trout. Accordingly in 1925 a lot of ~~2,500~~ ^{25,000} eggs was sent by the Bureau of Fisheries.

The eggs were secured from an eastern hatchery and were shipped to New York by rail; from there they were sent to the Canal Zone by boat; and from there to Volcán, Chiriquí, by airplane. En route the eggs were of course kept cool with ice. As no hatching trough or other facilities were available for incubating the eggs on the Río Chiriquí Viejo, they were merely buried to a depth of an inch or so in sand and gravel in comparatively quiet places in the stream, and there at least some of them hatched.

¹ Published by permission of the U. S. Commissioner of Fisheries.

* See: Hildebrand, Samuel Frederick. - 1938 ⁷⁶³
A new catalogue of the fresh-water fishes of
Panama. Chicago, Field Museum, p. 226.
(Zoological Series, Field Museum of Natural
History, 22(4): Sept. 28, 1938. Publication No. 425)

For four or five years the fish were not seen. Then some inquisitive sportsman began angling and succeeded in catching trout. Ever since that time anglers have gone from the Canal Zone to Chiriquí to fish for trout.

As already indicated, the Río Chiriquí Viejo is situated in the extreme southwestern corner of the Republic of Panama in the Province of Chiriquí. The lower course of the stream lies in a comparatively flat country, and as seen from an airplane it is rather winding. It is no doubt quite sluggish in the lowlands, as the maps indicate two mouths. From an elevation of about 5,000 to 7,000 feet, or a distance of about 10 miles, the stream was seen by the writer on foot, as well



Photograph by Samuel P. Hildebrand.

THE RÍO CHIRIQUÍ VIEJO AT 6,000 FEET.

In the higher altitudes numerous rapids are formed in the river by rocks and log jams. An excellent trout hole exists just below the rapids in the foreground.

as from the air. Here its course is not especially winding, but still far from straight.

The average width of the stream bed in the section examined on foot probably is about 35 to 40 feet from bank to bank. Although the river was examined during the dry season, it evidently was not at its lowest stage. It is certain, however, that it always has ample water for the welfare of the trout. The river, also, has several tributaries of fair size, which appear to be especially valuable for protection for the young and smaller trout from the older and larger ones.

The river bed is mostly quite rocky, the size of the rocks varying from gravel to large boulders. In places log jams and drift wood also

are present. There is little smooth bottom and collecting with a seine is nearly impossible. The larger tributaries are equally as rocky as the main stream.

The current is quite swift, and the roar of the stream may be heard a long distance. However, between the rapids comparatively large deep pools generally are present, making good hiding and resting places for the trout.

During the time (February 3 to 6) spent at Mr. Lewis' camp a check was kept on the temperature. There, at an elevation of about 6,000 feet, the temperature of the water in the river was 54° F. each morning at 7 o'clock, and each evening between 5 and 6 o'clock it was 57° F. Each morning the water and air temperatures were equal within one degree. However, of evenings the air was from 15 to 20 degrees warmer than the water. Every day was clear. Consequently, the tropical sun exerted its maximum influence. Presumably, the water is no warmer during the rainy season. Possibly it is cooler, as there is less sunshine. It is evident, therefore, that the water is amply cool for trout, at and above an altitude of 6,000 feet and for some distance below it.² According to information given by anglers, the trout do not descend the river far below an elevation of 4,000 feet.

That trout are quite numerous in the Río Chiriquí Viejo in the sections of the stream examined is obvious from the liberal catches made by anglers, and from collections and observations made by the writer. It was noticed several times that an angler would return with from 8 to 12 fish after fishing for an hour or so. Furthermore, small trout were common in the quiet shallow coves where, presumably, they were seeking protection from larger trout, for they have virtually no other enemies in the stream. It was reliably reported that two Americans desiring to make a test of how many trout could be taken during a whole day's fishing succeeded in catching 200 fish. Another American, who lives on the banks of the river, claims to be so certain of catching a trout within a few minutes' time that he often puts his skillet on the stove to heat while he goes to the river to catch a fish for his breakfast. It may be concluded, from the observations made and the many reports of large catches, that trout are quite numerous in the Río Chiriquí Viejo above an altitude of perhaps 4,000 to 4,500 feet.

² Air temperature records kept by Mr. R. G. Lewis at his camp at an elevation of about 6,000 feet during 1934 and part of 1935, kindly placed at the writer's disposal by him, show that the fluctuations are not great. Since the air temperatures do not fluctuate greatly it is certain that the temperature of the water is fairly constant throughout the year. The lowest temperature of the air during 1934 was 37° F., which occurred sometime during the first three months of the year when daily records were not kept. The highest temperature for the same period of time was 75° F. During the remainder of 1934, for which more definite records are available, the lowest temperature reached was 40° F., which occurred in June, and the highest 79° F., reached during three successive months, namely, October, November, and December. The lowest average minimum temperature for any one month during the nine months of 1934 for which records are available, is 50.3° F. for April, and the highest is 53.7° F. for September. The average maximum temperatures for the same period of time range from 66.4° F. in April to 73° F. in September. The lowest temperature reached during January and February 1935 was 41° F.

The fish that were caught during my visit by anglers were not large, as they ranged in length from about 8 to 12 inches. A few larger ones were seen in the river by me, and individuals up to 23 inches in length were reported by anglers.

Since my return from Panama Mr. R. G. Lewis has sent a photograph of a large trout taken in the Río Chiriquí Viejo at an altitude of about 6,000 feet 25½ inches in total length, weighing 5¼ pounds. This fish has been mounted and is on exhibition in Mr. Lewis' store in Panama city. It is evident, therefore, that some of the trout attain a large size.



Photograph by Samuel F. Hildebrand.

AIR VIEW OF THE LOWER RIO CHIRIQUI VIEJO.

Its slow meandering course is in sharp contrast with its precipitousness in the uplands. The temperature of the stream in the lowlands is of course too high for trout to endure.

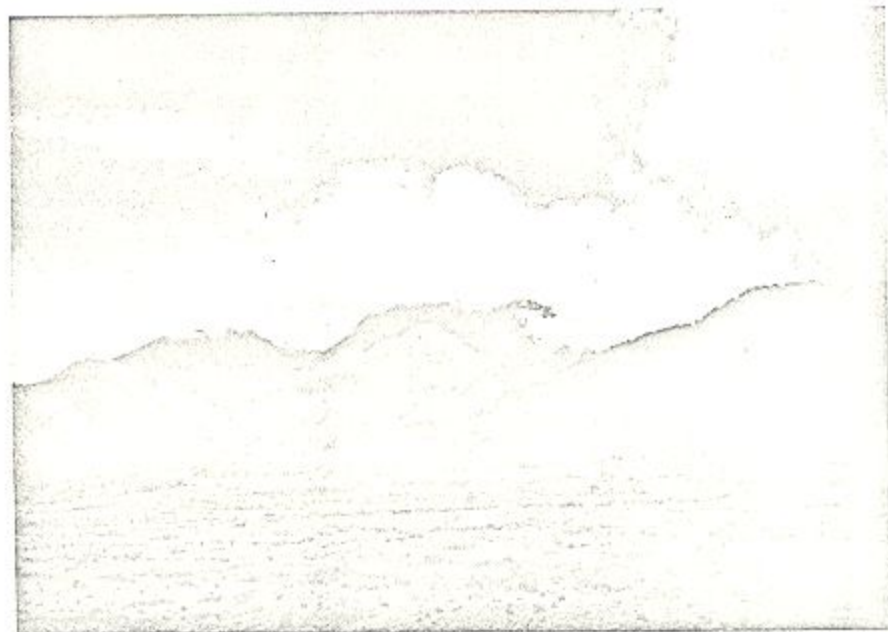
One of the principal objects of my visit to the Río Chiriquí Viejo was to ascertain on what the trout feed and the probable abundance of the food. Such information is regarded as especially desirable in determining whether other streams in the tropics are suitable for the support of trout. Accordingly, observations and collections were made in the main stream and some of its tributaries, and the stomachs and intestines of 45 adult trout were preserved and later examined in the laboratory. Also, the stomachs of 6 young trout, ranging in length from 19 to 51 mm, were examined.

No native fish are present. Therefore, the trout do not feed on fish, except as they sometimes may feed on each other. They exist

principally, as shown by the contents of 51 stomachs, on insects, taking occasionally in addition a few ostracods and amphipods.

Spawning apparently takes place principally during November and December, though limited spawning extends over a much longer period of time.

The opportunity to make an inspection and to gain first hand information relative to the ecological conditions obtaining in the Río Chiriquí Viejo came to the writer through the generosity of Dr. Herbert C. Clark, director of the Gorgas Memorial Laboratory, Panama City, during a recent visit to the Panama Canal Zone. Accordingly the period extending from February 2 to 8, 1935, was devoted to the investigation. The writer is indebted, also, to Mr. R. G. Lewis of Panama city for making all arrangements for the airplane flight to the vicinity and for the use of his camp on the banks of the river during most of the investigation. Thanks are due, likewise, to Mr. W. H. W. Komp of the United States Public Health Service, who was a member of the party, for very helpful assistance, and to Dr. T. W. Earhart, chief surgeon at the Gorgas Hospital, Ancon, Canal Zone, for preserving trout stomachs for examination. Without the co-operation of these gentlemen the investigation could not have been made.



Photograph by Marcel J. Busard.

THE MOUNTAINOUS REGION OF THE UPPER CHIRIQUÍ VIEJO.

For a distance of about 15 miles the river borders the volcanic plain at the foot of the heavily forested cordillera.