Reprinted from COPEIA, 1943, No. 1, March 31

Ichthyological Notes

THE ARTIFICIAL PROPAGATION AND GROWTH OF THE COMMON WHITE SUCKER, *CATOSTOMUS C. COMMERSONNII,* AND ITS VALUE AS A BAIT AND FORAGE FISH.—In 1937 I started a series of experiments that were designed to determine which of the bait and forage fishes are best suited to pond culture. It was believed that the information obtained would be useful to bait dealers who raise their own minnows and to hatchery men who are engaged in rearing such game fish as northern pike, wall-eyes and the black basses.

The rearing of bait minnows is generally regarded as desirable, because the seining of the supply in natural waters seems to have led to local depletion. As a result it has often proved increasingly difficult and expensive to obtain adequate numbers for the bait trade and the reduction in the natural forage fish population may be deleterious. Restrictions on minnow seining have been invoked and more rigorous protective measures have been contemplated.

For similar reasons it has been found desirable to rear forage fish to serve as food for game fish being reared in hatcheries. Good growth often results from the feeding of live food, and other foods are becoming increasingly expensive and sometimes impossible to obtain, particularly under present war conditions. The current tendency to rear game fish to larger size before they are planted increases the need for an adequate supply of forage fish.

There may also be a need for culturing such coarse fishes as the suckers to increase the supply of fish for human consumption, and this need may become pressing during the war. The hatcheries may be called on to produce such fish, for establishment or increase in natural waters and in artificial ponds. Some hatchery ponds may even be used to rear fish for human food.

An experiment on the artificial propagation of the common white sucker was conducted at the Drayton Plains Fish Hatchery of the Michigan Department of Conservation. On May 2, 1937, 6 quarts of sucker eggs were obtained from White Lake in Oakland County, Michigan, by personnel of the Drayton Plains Hatchery, and the writer. Ordinary stripping technique was employed and Mr. A. T. Stewart, Superintendent of

the hatchery, used corn starch to prevent adhesion of the eggs. From observations that have been made since, this was a necessary precaution, because the eggs of the sucker are slightly adhesive. According to Mr. Stewart there were 1,000 eggs in a fluid ounce (32,000 per quart), as he determined by counting the eggs in two 1-ounce samples. The eggs hatched in regular hatchery jars in twelve days at an average water temperature of 53° F. Immediately after hatching the fry remained at the bottom and along the sides of the jars and were unable to rise and leave the jars as wall-eyed pike and whitefish do. The constant rolling probably caused the loss of a large percentage of the newly-hatched yolk-fry. A total of only 3 quarts of fry survived, although more than 90 per cent of the eggs had hatched. More of the fry could no doubt be saved by placing the eyed eggs, just before hatching, on cheesecloth trays in ponds.

On May 16, one quart of sucker fry (approximately 32,000 fish) was placed on a cheesecloth tray in a small experimental pond that had a surface area of about 0.1 acre and a maximum depth of 3 feet. It was not considered necessary to add fertilizer to the pond because this was the first season that the pond had been used. In order to determine whether the suckers would take artificial food, feeding was attempted over about a two-week period during August. Finely ground sheep liver, ground dog biscuit, or a mixture of these two were fed once daily during the two-week period. Observations disclosed that the suckers took artificial food off the bottom of the pond.

Observations during the latter part of June revealed that fishes other than the sucker were present in the pond. Seining yielded a number of wall-eyes, yellow perch and creek chubs. All of these predatory fish were removed from the pond, but they had undoubtedly consumed some of the small suckers. These fish had evidently been placed in the pond with the sucker fry. They must have entered the hatching jars containing the sucker eggs, from jars of the same battery that contained these other species. The wall-eyes averaged about 3 inches and the perch about 2 inches in total length.

The pond was drained on November 17, 1937, just 186 days after planting. There were removed at this time a total of 2,775 suckers, representing an 8.67 per cent survival, and weighing 28.75 pounds. This production was at the rate of 27,750 fish and 287.5 pounds per acre. The suckers averaged 86.5 mm. (3.4 inches) in total length, and ranged from 54 to 163 mm. (2.1 to 6.4 inches).

During the past several years, two Michigan minnow dealers have attempted to raise suckers for bait. One of these dealers has not reported yet whether he had any success or not. The other dealer collected and fertilized some sucker eggs and placed them on the sandy bottom of a small pond. Some of these eggs hatched and the fish made excellent growth during their first summer.

In the spring of 1942, 12 quarts of sucker eggs were collected and hatched in jars at the Lydell Hatchery. Eight quarts of sucker fry were placed in a small pond containing wall-eye fry on May 4. From this time until May 28, young suckers were in evidence about the pond. Stomach examinations that were made on several wall-eyes collected on May 28 revealed that some of the suckers had been eaten by the wall-eyes. On this date the wall-eyes had an average total length of 35 mm. and the suckers averaged 22 mm. Suckers were not observed about the pond after about the first of June, and none were collected after May 28. The wall-eyes increased very little in length after the supply of suckers was exhausted.

In 1941, Ray Huntington, a commercial minnow dealer in Minnesota, started to raise suckers for the bait market (Horton, The Conservation Volunteer, Minnesota Department of Conservation, 4 (24), 1942: 29-30). Huntington used the jar method of hatching suckers, and transferred the young to rearing ponds. He was able to hatch three different batches of eggs in 1942 by obtaining eggs from three different spawning runs of adult suckers in different streams. Many of the suckers were large enough to be seined and sold for bait during the month of July in 1942. That it is possible to incubate sucker eggs in jars has also been mentioned by Raney and Webster (1942, COPEIA: 139-148).

The writer wishes to thank Messrs. A. T. Stewart and Claude Lydell for their cooperation during the course of these experiments. Thanks are also due Dr. Carl. L. Hubbs, who kindly read this manuscript and offered suggestions and criticisms.—W. F. CARBINE, *Michigan Department of Conservation, Institute for Fisheries Research, Ann Arbor, Michigan.*

Original: Copeia - L. A. Walford
cc: Fish Division
Mr. C. Lydell - 12-29-42
Mr. A. T. Stewart - 12-29-42
Education-Game
Inst. for Fisheries Res.
W. F. Carbine

December 23, 1942

REPORT NO. 837

THE ARTIFICIAL PROPAGATION AND GROWTH OF THE COMMON WHITE SUCKER, CATOSTOMUS C. COMMERSONNII, AND ITS VALUE AS A BAIT AND FORAGE FISH

by

W. F. Carbine

In 1937 I started a series of experiments that were designed to determine which of the bait and forage fishes are best suited to pond culture. It was believed that the information obtained would be useful to bait dealers who raise their own minnows and to hatchery men who are engaged in rearing such game fish as northern pike, walleyes and the black basses.

The rearing of bait minnows is generally regarded as desirable, because the seining of the supply in natural waters seems to have led to local depletion. As a result it has often proved increasingly difficult and expensive to obtain adequate numbers for the bait trade and the reduction in the natural forage fish population may be deleterious. Restrictions on minnow seining have been invoked and more rigorous protective measures have been contemplated.

For similar reasons it has been found desirable to rear forage fish to serve as food for game fish being reared in hatcheries. Good growth often results from the feeding of live food, and other foods are becoming

increasingly expensive and sometimes impossible to obtain, particularly under present war conditions. The current tendency to rear game fish to larger size before they are planted increases the need for an adequate supply of forage fish.

There may also be a need for culturing such coarse fishes as the suckers to increase the supply of fish for human consumption, and this need may become pressing during the war. The hatcheries may be called on to produce such fish, for establishment or increase in natural waters and in artificial ponds. Some hatchery ponds may even be used to rear fish for human food.

An experiment on the artificial propagation of the common white sucker was conducted at the Drayton Plains Fish Hatchery of the Michigan Department of Conservation. On May 2, 1937, six quarts of sucker eggs were obtained from White Lake in Oakland County, Michigan, by personnel of the Drayton Plains Hatchery and the writer. Ordinary stripping technique was employed and Mr. A. T. Stewart, Superintendent of the hatchery, used corn starch to prevent adhesion of the eggs. From observations that have been made since, this was a necessary precaution, because the eggs of the sucker are slightly adhesive. According to Mr. Stewart there were 1,000 eggs in a fluid ounce (32,000 per quart), as he determined by counting the eggs in two 1-ounce samples. The eggs hatched in regular hatchery jars in 12 days at an average water temperature of 53° F. Immediately after hatching the fry remained at the bottom and along the sides of the jars and were unable to rise and leave the jars as walleyed pike and whitefish do. The constant rolling probably caused the loss of a large percentage of the newly-hatched yolk-fry. A total of only 3 quarts of fry survived, although more than

90 per cent of the eggs had hatched. More of the fry could no doubt be saved by placing the eyed eggs, just before hatching, on cheesecloth trays in ponds.

On May 16, one quart of sucker fry (approximately 32,000 fish) was placed on a cheesecloth tray in a small experimental pond that had a surface area of about 0.1 acre and a maximum depth of 3 feet. It was not considered necessary to add fertiliser to the pond because this was the first season that the pond had been used. In order to determine whether the suckers would take artificial feed, feeding was attempted over about a two-week period during August. Finely ground sheep liver, ground dog biscuit, or a mixture of these two were fed once daily during the two-week period. Observations disclosed that the suckers took artificial food off the bottom of the pond.

Observations during the latter part of June revealed that fishes other than the sucker were present in the pond. Seining yielded a number of walleyes, yellow perch and creek chubs. All of these predatory fish were removed from the pond, but they had undoubtedly consumed some of the small suckers. These fish had evidently been placed in the pond with the sucker fry. They must have entered the hatching jars containing the sucker eggs, from jars of the same battery that contained these other species. The walleyes averaged about 3 inches and the perch about 2 inches in total length.

The pond was drained on November 17, 1937, just 186 days after planting. There were removed at this time a total of 2,775 suckers, representing an 8.67 per cent survival, and weighing 28.75 pounds. This production was at

the rate of 27,750 fish and 287.5 pounds per acre. The suckers averaged 86.5 mm. (3.4 inches) in total length, and ranged from 54 to 163 mm. (2.1 to 6.4 inches).

During the past several years, two Michigan minnow dealers have attempted to raise suckers for bait. One of these dealers has not reported yet whether he had any success or not. The other dealer collected and fertilized some sucker eggs and placed them on the sandy bottom of a small pond. Some of these eggs hatched and the fish made excellent growth during their first summer.

In the spring of 1942, 12 quarts of sucker eggs were collected and hatched in jars at the Lydell Hatchery. Eight quarts of sucker fry were placed in a small pond containing walleye fry on May 4. From this time until May 28, young suckers were in evidence about the pond. Stomach examinations that were made on several walleyes collected on May 28 revealed that some of the suckers had been eaten by the walleyes. On this date the walleyes had an average total length of 35 mm. and the suckers averaged 22 mm. Suckers were not observed about the pond after about the first of June, and none were collected after May 28. The walleyes increased very little in length after the supply of suckers was exhausted.

In 1941, Ray Huntington, a commercial minnow dealer in Minnesota started to raise suckers for the bait market (Horton, The Conservation Volunteer, Minnesota Department of Conservation, 4 (24), 1942: 29-30). Huntington used the jar method of hatching suckers, and transferred the young to rearing ponds. He was able to hatch three different batches of eggs in 1942 by obtaining eggs from three different spawning runs of adult suckers in different streams. Many of the suckers were large enough

to be seined and sold for bait during the month of July in 1942. That it is possible to incubate sucker eggs in jars has also been mentioned by Ramey and Webster (Copeia, 1942 (3): 139-148).

The writer wishes to thank Messrs. A. T. Stewart and Claude Lydell for their cooperation during the course of these experiments. Thanks are also due Dr. Carl L. Hubbs, who kindly read this manuscript and offered suggestions and criticisms.

INSTITUTE FOR FISHERIES RESEARCH

By W. F. Carbine

Report approved by: A. S. Hazzard

Report typed by: G. Wood