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THE COLLECTING OF BROOD STOCKS OF RED-BELLIED DACE (Chrosomus eos) AND MUD MINNOWS (Umbra limi) and THEIR TRANSPORTATION TO OHIO

by Gerald P. Cooper

Dr. T. H. Langlois, Chief of the Bureau of Fish Propagation, of the Ohio Division of Conservation, has recently been very generous in obtaining Gizzard Shad and transporting them to Whitmore Lake as an experimental planting for the Institute for Fisheries Research of the Michigan Department of Conservation. Details on these plantings have already been presented by M. B. Trautman in Institute reports 315 and 320. In order to repay Dr. Langlois for his efforts, the Institute has obtained stocks of forage minnows (species which Langlois expressed a desire to obtain for experiment), and has delivered them to two Ohio hatcheries.

Between August 21 and 22, 1935, the writer collected approximately 600 Chrosomus eos from a completed experiment, conducted at the Drayton Plains Hatchery during the summer of 1935, and several hundred Mud minnows (Umbra limi) from a woodland pond about 10 miles south of Ann Arbor. On August 22, these two stocks were delivered by Alvin Moore, Trautman and the writer in one of the fish-transporting units (Truck No. 40) of the Michigan Conservation Department to the Lake St. Marys Hatchery in Ohio. There was practically no loss of these minnows during this transportation.

On October 10 at 7 A.M., an Ohio fish-transporting unit, driven by Messers. Yingling and Bupp, arrived at Whitmore Lake with a load of Gizzard Shad. After the fish were liberated, the writer joined these two men in an attempt to obtain another, larger stock of Chrosomus eos for Ohio. With these men the

writer spent October 10 and 11 seining in Newaygo, Kalkaska and Crawford counties for a brood stock of this species. Our attempts were unsuccessful and the Ohio men returned on October 12. From the standpoint of these Ohio men this trip was not an entire loss, for they had the opportunity of seeing many Michigan lakes and streams, of visiting the Comstock Park, Paris, and Grayling state fish hatcheries, and of discussing problems of fish culture with the personnell of these hatcheries.

On October 25, 1935, Mr. E. L. Cooper and the writer obtained a large stock of Chrosomus eos from an old beaver pond on a tributary stream of the Pigeon River, in Section 10, Corwith Twp., T 32 N, R 1 W, Otsego County, Michigan. The beaver dam which formed the pond had been partially destroyed; consequently the pond was in the process of drying up. The stream running through it was very small (flow 30 g.p.m.), and our observations indicated that all fish within the immediate vicinity were congregated within the pond. No fish were seen in the stream. The pond was approximately 30' x 15' and had a maximum depth of 2'. Two hauls with a 30' common sense seine removed practically all (estimated at 98%) of the fish. These fish were distributed among five milk cans, taken to the Grayling hatchery and placed in hatchery troughs. From this lot, we sorted practically all of the Chrosomus eos to be sent to Ohio. The smallest of the C. eos and all other fish were preserved for future study as was also a small random sample of the fish to be sent to Ohio. The shipment of live Chrosomus, as they were taken from the Grayling hatchery, weighed exactly 10 pounds. A single pound, taken at random, was counted and contained 703 dace; thus this shipment contained, according to our figures, 7,030 fish. This number included approximately 50 fish which were injured or killed during the process of sorting. According to Trautman, there were only 52 dead fish in the lot at the time of arrival at the Ohio hatchery. Thus Mr. Langlois obtained slightly less than 7000 live fish.

The preserved random sample of the Ohio shipment contained:

No.	Species	Range: S.L. in mm.
144	Red-bellied Dace <u>Chrosomus eos</u>	29-46
3	Fine-scaled Dace <u>Pfrille neogaea</u>	20-25
5	Hybrids <u>Chrosomus</u> × <u>Pfrille</u>	43-52

Assuming that this random sample was typical of the entire Ohio shipment, the 7,030 fish consigned to Mr. Langlois included:

No.	Species	Range: S.L. in mm.
6660	Red-bellied Dace <u>Chrosomus eos</u>	29-46
139	Fine-scaled Dace <u>Pfrille neogaea</u>	20-25
231	Hybrids <u>Chrosomus</u> × <u>Pfrille</u>	43-52

The transportation of these fish is summarized as follows: They were seined from the beaver pond in Otsego County, Michigan between 8 and 9 A.M., October 25, 1935. Between 9 and 11 A.M. they were transported in five milk cans to the Grayling Hatchery. They were held in the hatchery troughs until 3 A.M. on October 26, during which time the Chrosomus were sorted from the lot. Between 3 and 9 A.M. the 7,030 Chrosomus were transported from Grayling to Ann Arbor in the five milk cans. Shortly after 9 A.M. Trautman left Ann Arbor with the fish for Ohio, taking them 205 miles to the Buckeye Lake Fish Farm in Fairfield County, Ohio (30 miles east of Columbus). In transporting these fish only one stop was made (at Fostoria, Ohio) where \$0.10 worth of ice was obtained. This ice was cracked in suitable pieces and placed on and in the milk cans containing the fish. Upon arrival at the Ohio fish farm, the living fish were noted swimming at the bottom of the can, and showed every indication of being in excellent condition. The temperature in the

cans at the time of the release of the fish was 11°C., the same temperature as the pond into which they were liberated. Upon liberation, all the fish, except the 52 dead or dying ones, rapidly swam away and disappeared. At least 40 of the 52 showed definite signs of injuries from handling. It is gathered from the apparent splendid condition of the minnows upon liberation that the transportation from Grayling to the Buckeye Lake fish farm, a distance of over 400 miles, was made with a loss of less than two dozen fish. This indicates the ease with which this species can be transported in cool weather.

The extreme hard¹ness of this minnow, its ability to withstand over-crowding and the ease with which it can be handled and transported make it a species very suitable for bait. Its use as a bait minnow might be encouraged by specifying certain non-trout bog ponds in the northern part of the state, where it is abundant, from which it could be seined by bait dealers; before an attempt be made to utilize this source of bait, investigations should be made to determine whether or not any of these waters contain trout.

Recent results obtained by the Institute have indicated that Chrosomus eos is well suited to pond propagation. Throughout the natural range of this species in the northern part of Michigan, it commonly occurs in the same habitat with the closely related Fine-scaled Dace (Pfritte neogaea). Where the two occur together, they hybridize considerably. It is quite probable that Pfritte neogaea may also prove to be a good species for pond propagation. From the standpoint of propagation, the hybrid ratio between the two is worthy of considerable study. It was for this reason that all of the fish of this collection, except the Chrosomus, were preserved. An analysis of the total collection taken from this beaver pond is given in the following table.

Species*	Preserved after sorting out <u>Chrosomus</u>		Preserved random sample of Ohio shipment		Ohio shipment		Total	
	No.	Range: S.L. in mm.	No.	Range: S. L. in mm.	No.	Range: S.L. in mm.	No.	Range: S.L. in mm.
<u>Chrosomus eos</u>	228	16-46	144	29-46	6660	29-46	7032	16-46
<u>Pfrille neogaea</u>	244	17-75	3	20-25	139	20-25	386	17-75
<u>Chrosomus</u> × <u>Pfrille</u>	138	18-64	5	43-52	231	43-52	374	18-64
<u>Hybognathus hankinsoni</u>	667	21-60	...	....	...	....	667	21-60
<u>Pimephales promelas promelas</u>	1089	15-55	...	....	...	....	1089	15-55
<u>Eucalia inconstans</u>	497	20-51	...	....	...	....	497	20-51
Tadpoles	18	34-60	...	....	...	....	18	34-60

The ratio of Chrosomus eos to Pfrille neogaea to hybrids was approximately 18.5 to 1 to 1. As in most instances where the two species occur together, the Chrosomus far outnumbered the Pfrille and hybrids.

* The numbers of Pfrille, Chrosomus, and hybrids among the 7030 fish sent to Ohio are calculated from the relative abundance of the three forms in the preserved random sample. Laboratory identifications of the Chrosomus, Pfrille, and hybrids were made by Dr. Carl L. Hubbs).