

# A Valuable Forage Fish of North Dakota<sup>1</sup>

by

HORACE S. TELFORD, Assistant Entomologist  
North Dakota Agricultural Experiment Station

**F**ORAGE fish are those "minnows" or smaller species which are utilized by the larger fish as food. The northern fat-headed minnow\* comprises a large percentage of the total number of forage fish occurring in our lakes and smaller streams and accordingly constitute an important source of food for our larger game fish. This minnow is apparently well adapted to water of high salinity and alkalinity. Pope (1908) recorded it in great numbers from Devils Lake in company with the brook stickle-back, *Eucalia inconstans*,

which is notoriously tolerant to alkaline and saline conditions. The total solids of the lake water at that time was 8,517 parts per million. By 1925 these minnows had apparently either disappeared or were so few in number that authentic records are lacking and total solids of the water in this lake had increased to 15,889 parts per million (Abbot). It would appear that salinity or alkalinity except in extreme cases would not be a limiting factor in the distribution of these minnows in North Dakota.

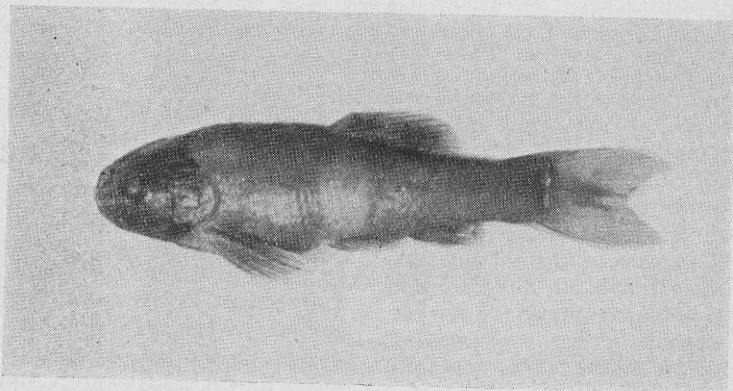


Figure 1. ADULT MALE, NORTHERN FAT-HEADED MINNOW, LENGTH 2½ INCHES.

## Description:

This interesting fish is relatively robust, seldom exceeding 3¼ inches in length. The male may be readily recognized during the summer by the numerous short horns or tubercles on its face and by a dorsal pad or brush-like row of thickened scales between the base of the head and the dorsal fin. These second-

ary sexual characteristics of the male are lost during the non-breeding season. The female lacks the tubercles and dorsal pad, is more slender, although when carrying eggs, the abdomen is somewhat extended. The head of both sexes is generally dark and due to this fact is sometimes called the black-headed minnow.

\*The scientific name of the northern fat-headed minnow is *Pimephales promelas*.

(1) A progress report on Bankhead-Jones Project No. 11—"Influence of artificial lakes and ponds upon the immediate environment in relation to kinds and abundance of animal life."

### Spawning Habits:

This minnow is extremely prolific and rapidly reaches sexual maturity. In Iowa a single pair has been known to produce 4,144 individuals in one summer during which time this single female spawned 12 different times, and in a few exceptional cases eggs that were laid in May grew into sexually mature adults which spawned in July of the same year. Under our conditions, however, the life cycle is probably much longer—possibly 1 to 3 years.

In North Dakota the eggs are laid in June and the egg-laying period may extend well into August. The female lays numerous round eggs 1/16 of an inch in diameter in shallow water on the undersides of boulders, vegetation, submerged logs, or sticks. During the past summer (1940) the writer observed an egg population of 2,500 per square foot attached to boulders along the shoal area of Lake Tewaukon (Sargent County, N. D.). The males apparently have the entire charge of the nest, are very pugnacious and stand guard over them until they hatch. It is believed by some that the dorsal pad of the male is used to brush silt away from the eggs or to turn them over from time to time so that they may have an adequate supply of oxygen. Eggs were hatching at Tewaukon on July 4 with the water temperature at 72° F., while at Lake Yanktonai (Mercer County) no hatching was in progress on July 12, although the water temperature was also 72° F.

### Food Habits:

In introducing a species of fish for forage purposes, two important factors must first be taken into consideration: (1) Do they compete with the game fish for food? (2) Are they predaceous upon the game fish fry or fingerlings? Since animal plankters (small microscopic organisms which live suspended in the water) are the principal source of food for immature game fish, a

forage species should be selected as far as possible which obtains its nourishment from the plant kingdom and accordingly will not compete with game fish for food. The northern fat-headed minnow is almost ideal in this regard. From our preliminary investigations on the feeding habits of this species and from the work of Coyle (1930), it would appear that it lives largely upon algae, (microscopic plant life) which constitute very little of the normal food of game fish.

### Management:

Where the farm pond is being used to propagate pan fish, this minnow can be introduced and maintained to an advantage. Its long spawning period, its rapid growth, and its great powers of reproduction make it a constant source of food for game fish. Very little need be done to the lake or pond to provide food, cover, and spawning facilities. Stones, submerged logs, old tiling or other materials may be introduced in the shallower areas to supply adequate facilities for spawning and cover. Investigations in other states relating to the use of various fertilizers in ponds in order to increase plankton production have been very successful. While experiments of this nature in North Dakota are lacking, this procedure might be desirable should the plankton supply be inadequate.

### References Cited:

- Abbott, G. A. 1925. A Chemical Investigation of the Water of Devils Lake, North Dakota. Proc. Ind. Acad. Sci. 34: 181-184.
- Coyle, Elizabeth E. 1930. The Algal Food of *Pimephales promelas* (Fathead Minnow) Ohio Jour. Sci. 30: 23-35.
- Pope, T. E. B. 1908. Devils Lake, North Dakota, A Study of Physical and Biological Conditions With a View to the Acclimatization of Fish. U. S. Bureau of Fisheries. Doc. 234: 1-22.