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Notes on the Status and Life History of the Northern Madtom, *Noturus stigmosus*, in Mississippi

NOTES ON THE STATUS AND LIFE HISTORY OF THE NORTHERN MADTOM, *NOTURUS STIGMOSUS*, IN MISSISSIPPI

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INTRODUCTION

The northern madtom, *Noturus stigmosus*, occurs throughout the tributaries of the Mississippi River. Rhode (1980) reported the species being found in western Mississippi and Tennessee, north throughout much of the Ohio River basin to northern Indiana and extreme western Pennsylvania. It has also been collected in the western Lake Erie drainage in Ohio, Indiana and Michigan. In Kentucky, Burr and Warren (1986) reported the species as sporadic/uncommon in the upper Green, upper Kentucky, and upper Big Sandy rivers and occasional/locally common in the Salt and Licking river drainages. In the state of Mississippi, the species has been reported from the Big Black drainage, the Lower Mississippi North drainage (in north Mississippi this includes the Wolf and Hatchie Rivers) and the Yazoo River drainage (Ross and Brenneman 1991). The distributional map in Rhode (1980) shows the species distributed in northern Mississippi but the exact locations are not given.

The northern madtom is wide-ranging but apparently very uncommon. Taylor (1969) reported that the species is never very common and in western Tennessee occupies small rivers and creeks. All specimens taken to date have been large and were scattered over considerable distances. The northern madtom is currently listed as rare and/or threatened in the State of Mississippi by the Mississippi Department of Wildlife, Fisheries, and Parks.

I initiated a survey to more clearly determine the distribution and abundance of the northern madtom in the State of Mississippi. The almost complete lack of information concerning the biology of this species and the continuing loss of aquatic habitat in the state of Mississippi made this survey a high priority.

MATERIALS AND METHODS

From March to September 1988 and March to October 1989, we sampled the Tuscumbia, Hatchie, and Wolf River drainages of northern Mississippi by electroshocking with a back-pack electroshocker. We sampled in an upstream direction while an assistant, following close behind, collected the stunned fish with a dip net. We electroshocked at each site for approximately one hour, covering a distance of 50 to 100 m. Because some *Noturus* spp. prefer cover and are substrate oriented, stream banks, undercuts, leaf litter, and riffle areas were targeted. A small boat was used to sample at sites other than road crossings. Water temperature and

dissolved oxygen were measured at each site using a Yellow Springs Instruments temperature/dissolved oxygen meter. In addition, current, turbidity, substrate type, water depth and stream width were recorded.

RESULTS

A total of 59 collections from 38 different sites was made during the survey (Fig. 1). Five sites were sampled in the Tuscumbia River drainage, 12 sites in the Wolf River drainage, and 21 sites in the Hatchie River drainage. Seven specimens of *N. stigmosus* (75 to 90 mm TL, total length) were collected along approximately 100 m of the Hatchie River at the State Highway 4 crossing on 10 and 20 June 1988 (Fig. 1, site #1). An additional specimen (95 mm TL) was collected on the same day approximately 5 km downstream from the Highway 4 crossing (Fig. 1, site #2). On 26 August 1989 a single specimen (46 mm TL) was collected in the Hatchie River at the first road crossing north of State Highway 72 (Fig. 1, site #4). Collections from the Wolf River drainage on 28 August and 15 September 1988 produced 3 specimens of *N. stigmosus* (Fig. 1, site #3). At the above localities, temperature ranged from 20 to 26°C, dissolved oxygen ranged from 4.6 to 8.5 ppm, current velocity was slow to moderate, the substrate was a composite of sand and mud, and water clarity was from very clear to turbid (Table 1). Specimens were found in association with stream banks and/or benthic aggregates of leaf litter.

DISCUSSION

The northern madtom normally occurs in low numbers throughout its range. The examination of low density species is important because they may be particularly sensitive to environmental changes, both natural and those caused by man's activities. While few specimens of *N. stigmosus* were collected during this study, valuable information concerning distribution, habitat, and status was obtained.

This study confirms the occurrence of *N. stigmosus* in the Hatchie River drainage as reported by Rohde (1980). In addition the species was collected from the Wolf River drainage and represents a new distributional record for the state. No specimens were collected in the Tuscumbia River which has been extensively channelized creating high current speeds, steep banks, and very deep water. These conditions are not conducive to collection by back-pack electroshocker and after the first year of the study, surveys in the Tuscumbia

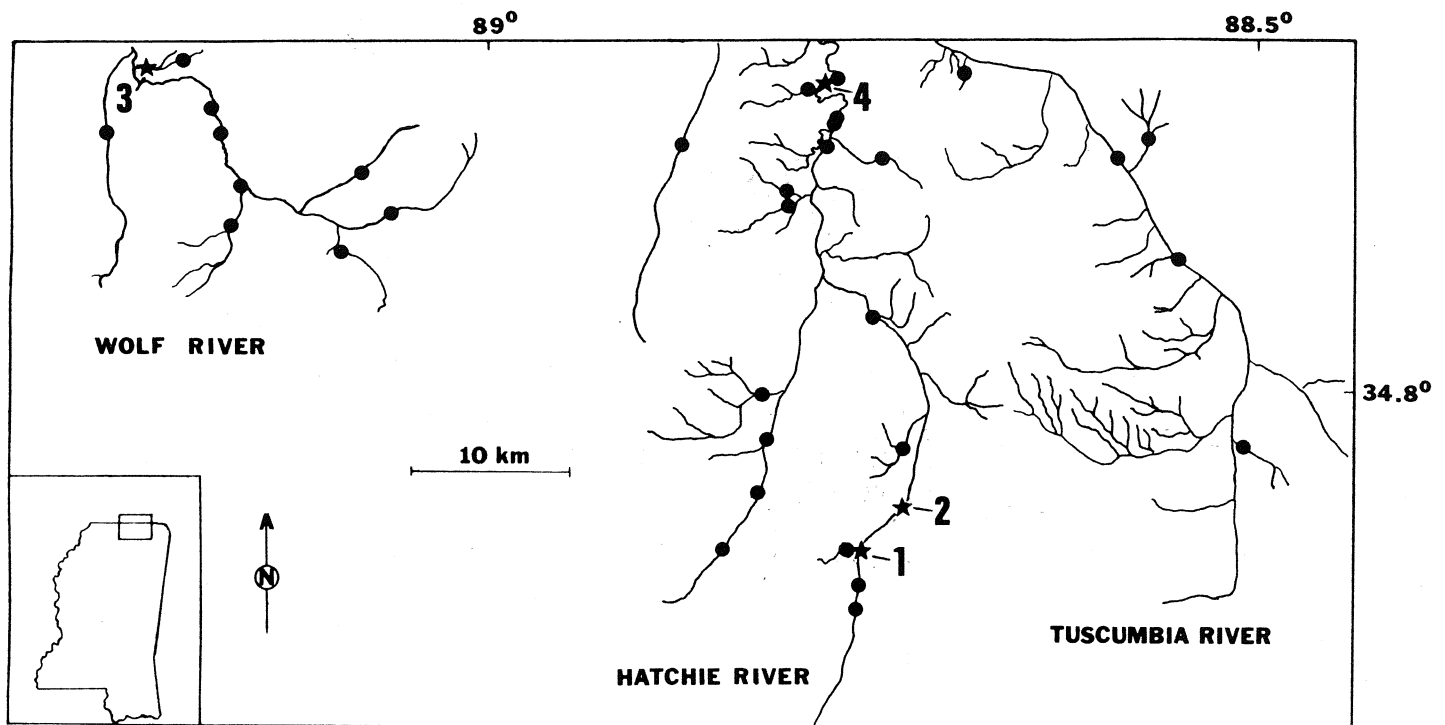


Figure 1. A map of localities surveyed for the northern madtom, *Noturus stigmosus*, on the Wolf, Hatchie and Tuscumbia Rivers of Mississippi. The circles are sites where the species was not found and the stars correspond to locations where the species was collected. The numbers indicate locations according to the following key: Number 1-the Hatchie River/Mississippi Highway #4 crossing. Number 2-the Hatchie River about 4.8 km N.E. of Location 1. Number 3-91.4 m upstream from the Indian Creek/Mississippi Highway #7 crossing. Number 4-the first road crossing on the Hatchie River north of Mississippi Highway #72.

Table 1. A summary of data recorded at sites where *N. stigmosus* were collected.

Location (see Fig. 1)	Number Collected	Date	Total Length (mm)	Water Temp. (°C)	Dissolved Oxygen (ppm)	Water Clarity	Depth (cm)	Current	Substrate Type
1	2	6/10/88	85-90	20	8.5	clear	15	moderate	sand/mud
1	5	6/20/88	75-80	22	8.0	muddy	50	slow	sand/mud
2	1	6/20/88	95	22	8.0	clear	<15	slow	sand/mud
3	1	8/28/88	100	25	6.2	clear	<50	moderate	sand/mud
3	2	9/15/88	58-108	26	6.5	clear	<50	moderate	sand/mud
4	1	8/26/89	46	26	4.8	muddy	30	slow	sand/mud

River were discontinued. It is possible that further collecting may eventually reveal the presence of this species in that drainage. However, the type of habitat that is apparently preferred by the northern madtom, i.e. benthic aggregates of leaf litter, may be less common in this drainage due to the increased transport of materials that accompanies channelization.

While many species of madtoms prefer fast moving riffles, *N. stigmosus* was never collected in these areas. The current velocity at sites where the species was collected was relatively slow. Indeed, at the most southerly site on the Hatchie River (Fig. 1) several specimens were found in pools downstream of the faster moving riffles. This is in contrast to specimens taken from the Huron River in Michigan where

they were found concentrated on riffle areas over which a fast current flowed (Taylor, 1969). All specimens were collected at sites with a sand/mud substrate. This may be significant since Taylor (1969) reports that all specimens from western Tennessee have been collected in areas of shifting sand and mud. Leaf litter, snags, roots, undercuts, and limbs were present in streams where the species was found. Most specimens were found associated with leaf litter. At many sites that appeared to be good madtom habitat, no *N. stigmosus* were found although other *Noturus* species (particularly *N. phaeus* and *N. hildebrandi*) were collected.

During the first year of this study *N. stigmosus* specimens were collected from two sites, with several coming from the same site. Despite intensive sampling at these sites during the second year of the study, no specimens were found. This suggests that aggregations of these fish, when they occur, are short term. This is in agreement with Taylor (1969) who noted that the few specimens that have been collected were scattered over considerable distances suggesting a lack of congregation of individuals. The results of this study confirm that *N. stigmosus* is an uncommon species in the State of Mississippi and suggest that it may be a candidate for rare and/or endangered species status.

ACKNOWLEDGMENTS

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