

**A REVIEW OF THE GENUS NOTURUS, WITH A DESCRIPTION OF ONE NEW SPECIES.**

**BY JOSEPH SWAIN AND GEORGE B. KALB.**

The present paper contains the synonymy and diagnostic characters of the species of the genus *Noturus* Rafinesque, with short descriptions of those species in the accounts of which we have found confusion.

The material on which this paper is based is partly the same which served for Professor Jordan's account of the genus (Bull. U. S. Nat. Mus. X, pp. 96 to 103, 1877), with the addition of numerous specimens since received by him from different parts of the United States. Among these we find a single species which appears to be new to science.

We desire to express our indebtedness to Professor Jordan for the use of his collections and library, and for valuable suggestions.

ANALYSIS OF SPECIES OF NOTURUS.

\* Premaxillary band of teeth with lateral backward processes. (*Noturus*.)

- a. Pectoral spine retrorsely serrate in front, almost or quite entire behind, its length 2 in head; body elongate; head about 4 in length; width of head about equal to depth of body,  $5\frac{1}{2}$  in length; distance from snout to dorsal 3 in length; maxillary barbel reaching nearly to gill-openings; adipose fin deeply notched; anal rays 16. Color nearly plain yellowish brown, "in northern specimens blackish above, slightly mottled"; size large, reaching a length of more than a foot.....FLAVUS, 1.

\*\* Premaxillary band of teeth without lateral backward processes. (*Schilbeodes* Bleeker.)

- b. Pectoral spine more or less dentate behind, serrate or somewhat roughened in front.
- c. Pectoral spine with posterior serræ weak, their length less than half the diameter of the spine; coloration almost uniform, margin of fins more or less edged with black.
- d. Pectoral spine very short and weak, about  $3\frac{1}{2}$  in head; adipose fin moderate, slightly notched; body robust; maxillary barbel short, 2 in head; jaws subequal; head not greatly depressed; anal rays 16.

ELASSOCHIR, 2.

- dd. Pectoral spine about 2 ( $1\frac{3}{4}$  to  $2\frac{1}{4}$ ) in head; body elongate, especially in adult; head flat and thin; upper jaw more or less projecting; anal rays 14 to 16.....INSIGNIS, 3.

cc. Pectoral spine with its posterior serræ strong, spine-like, recurved, each little if any shorter than diameter of spine.

- e. Adipose fin large, deeply notched, but connected with caudal; pectoral and dorsal spines very strong; coloration much variegated with black and grayish; top of head, tip of dorsal, middle of adipose fin, and caudal black, with four broad cross blotches, one before dorsal, one behind it, one across adipose fin, and a small one behind it: anal rays 12 or 13.

MIURUS, 4.

- ee. Adipose fin entirely distinct from caudal fin, separated from it by a distance equal to the diameter of the eye; spines as in *miurus*, but somewhat weaker; head broad and flat; [anal rays, 11]; coloration little mottled.....ELEUTHERUS, 5.

bb. Pectoral spine entire or grooved behind, never retrorse-serrate; adipose fin not at all or scarcely notched.

f. Head small and narrow, longer than broad; its length about 4 in body, its width  $5\frac{1}{2}$ ; upper jaw projecting; spines very short and weak, that of the dorsal one-third height of fin; pectoral spine slightly retrorse-serrate without, rather obscurely grooved within, its length  $3\frac{1}{2}$  in head; anal rays, 14; color yellowish, rather dusky on head; somewhat mottled .....LEPTACANTHUS, 6.

ff. Head short, broad, and deep; pectoral spine without serration in front, grooved behind, its length 2 in head; jaws subequal; barbels short, maxillary barbel more than 2 in head; color yellowish-brown, more or less dusky, never blotched; a narrow black lateral streak, and often two dorsal ones; anal rays, 15 or 16.....GYRINUS, 7.

1. *Noturus flavus* Rafinesque.

*Noturus flavus* Rafinesque, Am. Month. Mag. and Critical Rev., 41, 1818; Rafinesque, Ich. Ohiensis, 68, 1820 (Falls of Ohio); Kirtland, Bost. Jour. Nat. Hist., V, 336, 1846 (Mahoning River and Lake Erie); Storer, Syn., 406, 1846 (copied); Gill, Proc. Bost. Soc. Nat. Hist., 45, 1862; Cope, Journ. Acad. Nat. Sci. Phila., 236, 1869; Günther, Cat. Fishes, V, 184 (Ohio); ? Uhler and Lugger, Fishes of Maryland, 151, 1876 (Potomac and Patapsco Rivers); Jordan, Ann. N. Y. Acad. Sci., vol. I, No. 4, 1877, 118; Jordan, Ann. Lyc. Nat. Hist. N. Y., 372, 1877 (Platte River to Saint Lawrence River, Ohio Valley and N.E.); Jordan, Bull. Nat. Mus., X, 97, 99, 1877 (Vermont and Canada to Va., Ohio Valley, and Missouri region); Jordan, Rept. on Fishes of Ohio, 799, 1882. (Canada to Va., Mo., and Mon.); Jordan, Man. Vert., 335, 1878 (St. Lawrence to Ky. and Upper Mo.); Jordan, Bull. Ills. Lab. Nat. Hist., No. 2, 67, 1878; Jordan and Gilbert, Syn. Fishes N. A., 100, 1883 (Ver. to Va., Neb., and Tex.).

*Noturus luteus* Rafinesque, Jour. de Physique, 421, 1819.

*Noturus occidentalis* Gill, Proc. Bost. Acad. Nat. Hist., 45, 1862; Gill, Ichth. Capt. Simpson's Rept., 423, 1876 (Platte River); Jordan and Copeland, Check List, 160, 1876 (Platte River; no description).

*Noturus platycephalus* Günther, Cat. Fishes, V, 104, 1864 (N. A.); Jordan and Copeland, Check List, 160, 1876 (no description).

*Habitat.*—Vermont to Virginia and westward to Nebraska; Lake Erie; Saint Lawrence, Ohio, Mahoning, Potomac, Patapsco, White, Platte, and Missouri Rivers; Swartz Creek, Michigan.

2. *Noturus elassochir*, *sp. nov.*

*Habitat.*—Illinois River.

Head, 4; depth,  $5\frac{2}{3}$ ; width of head, 5. D. I, 6; A. 16.

Body robust, somewhat elevated in the dorsal region. Head moderate. Mouth large; its width  $1\frac{2}{3}$  in head. Interorbital space about equal to the length of snout, which is 3 in head. Jaws subequal. Maxillary barbel rather short,  $2\frac{1}{3}$  in head. Dorsal spine rather weak, but nearly as long as the very short pectoral spine, which is  $3\frac{1}{3}$  in head. The serration is very similar to that of *insignis*, but much less distinct in front. Humeral process obscure. Adipose fin long, low, with emargination well defined; caudal and anal fins large.

Color, in spirits, dark brown; vertical fins edged with darker; lateral line dark.

This species seems to be distinguished from *insignis* chiefly by the much shorter spines, by a slight difference in coloration, and by the more robust body. This species is described from a single specimen,  $4\frac{3}{4}$  inches long, taken at Napierville, Ills., by Dr. Ernest R. Copeland. The type (No. 29677, U. S. Nat. Mus.) has been presented by Professor Jordan to the United States National Museum.

### 3. *Noturus insignis* (Richardson) Gill and Jordan.

*Pimelodon livrée* Le Sueur, Mém. du Mus., V, 155, 1819.

*Pimelodus insigne* Richardson, Fauna Boreali Americana, III, 132, 1836. (Name only; based on Le Sueur's description.)

*Noturus insignis*, Jordan, Bull. U. S. Nat. Mus. X, 97 and 100, 1877 (Penn. to S. C.); Jordan and Brayton, Bull. U. S. Nat. Mus. XII, 87, 1878 (Ohio and the Rivers James, Great Pelee, and Santee); Jordan, Bull. U. S. Geol. Sur., 414, 1878 (no description); Jordan, Man. Vert., 335, 1878 (Penn. to S. C.); Bean, Proc. U. S. Nat. Mus. 112, 1880 (James River, Potomac River, and Bainbridge, Pa.); Jordan and Gilbert, Syn. Fishes N. A., 100, 1883 (Penn. to Ga.)

*Pimelodus lemniscatus* Cuv. and Val., Hist. Nat. Poiss., XV, 144, 1840; Storer Syn. Fishes, 405, 1846 (copied).

*Noturus lemniscatus* Girard, Proc. Acad. Nat. Sci., 159, 1859 (no description); Gill, Proc. Bost. Soc. Nat. Hist., 45, 1862; Günther, Cat. Fishes Brit. Mus., V, 104, 1864 (N. A.); Jordan, Man. Vert., 303, 1876; Jordan and Copeland, Check List, 160, 1876 (no description).

*Noturus occidentalis* Günther, Cat. Fishes, V, 105, 1864 (Platte River). (Not of Gill.)

*Noturus marginatus* "Baird, MSS.;" Cope, Jour. Acad. Nat. Sci. Phila., 237, 1869; Cope, Proc. Am. Philos. Soc., 484, 1870 (Catawba and Yadkin Rivers; no description); Jordan and Copeland, Check List, 160, 1876, (Ohio Valley to N. C.); Jordan, Ann. Lyc. Nat. Hist., XI, 372, 1877 (Ohio to Penn. and N. C.)

*Noturus crilis* Nelson, Bull. Ills. Mus. Nat. Hist., 51, 1876 (Ills. River); Jordan and Copeland, Check List, 160, 1876 (Ills. and Wis.); Jordan, Ann. Lyc. Nat. Hist., Vol. XI, 372 (Ills. and Wis.); Jordan and Brayton, Bull. Nat. Mus. XII, 87, 1878 (Ohio and Ills.; no description); Jordan, Man. Vert., 335, 1878 (Ills. to Kan.); Jordan, Cat. Fishes, Ills. 67, 1878 (Ills., Wis., and Kan.); Bean, Proc. U. S. Nat. Mus., 112, 1880 (South Grand River, Mo.); Jordan and Gilbert, Syn. Fishes N. A., 100, 1883 (Wis. to Mo. and Kan.).

*Habitat*.—Pennsylvania to Georgia and westward to Nebraska; Delaware, Susquehanna, James, Great Pelee, Santee, Catawba, Yadkin, Saluda, Ohio, Illinois, South Grand, and Platte Rivers.

Head  $3\frac{3}{4}$  to  $4\frac{1}{4}$  in length; depth 5 to  $6\frac{1}{2}$  in length; width of head  $4\frac{1}{2}$  to 6 in length. D. I, 7; A. 14 to 17.

Body elongate in adult; head flat and depressed. Pectoral spine with well-developed serrations in front, posterior serræ weak, their length less than half the diameter of the spine, which varies from  $1\frac{3}{4}$  to  $2\frac{1}{4}$  in head. Upper jaw usually projecting. Dorsal spine about half the height of

fin, 3 to 3½ in head. Adipose fin with slight notch. Maxillary barbel extending about to gill-openings. Coloration in spirits almost uniformly yellowish-brown; vertical fins yellowish usually, with a darker margin.

This description includes *N. exilis* Nelson, which is, in our opinion, not a distinct species.

#### 4. *Noturus miurus* Jordan.

*Noturus miurus* Jordan, Ann. Lyc. Nat. Hist. N. Y., 371, 1877 (Ohio Valley and S.W.); Jordan, Bull. U. S. Nat. Mus., X, 98 and 100, 1878 (Great Lakes, Ohio Valley, to Wis. and La.); Jordan, Rept. on Fishes of Ohio, 800, 1882. (Ohio Valley, Great Lakes, and southward to La.); Jordan, Ann. N. Y. Acad. Sci., 119, 1877 (White R., Wabash R., Ohio R., Tangipahoa R.); Jordan, Man. Vert., 336, 1878 (Ohio to Iowa and La.); Jordan, Bull. Ills. Lab. Nat. Hist., 63, 1878; Jordan and Gilbert, Syn. Fishes N. A., 99, 1883 (Great Lakes to Minn. and La.).

*Noturus eleutherus* Jordan, Bull. U. S. Nat. Mus., X, 101, 1878 (foot-note: not text; Tar River, N. C.) (not type); Jordan and Gilbert, Proc. U. S. Nat. Mus., 368, 1878 (Neuse River; no description); Jordan and Gilbert, Syn. Fishes N. A., 99, 1883 (rivers of N. C. and E. Tenn.)

*Habitat.*—Great Lakes to Minnesota and Louisiana; Great Lakes; Ohio, Wabash, White, Blue, Tar, Neuse, Tangipahoa Rivers.

#### 5. *Noturus eleutherus* Jordan.

*Noturus miurus* Jordan and Copeland, Check List, 160, 1876 (French Broad; no description).

*Noturus eleutherus* Jordan, Ann. Lyc. Nat. Hist. N. Y., 372, 1877 (French Broad River, Tenn.); Jordan, Bull. U. S. Nat. Mus., X, 101, 1877 (French Broad River); Jordan, Man. Vert., 336, 1878 (French Broad River).

*Habitat.*—French Broad River, Tennessee.

Head, 3¾; depth, 5½; width of head, 4½. D. I, 7; A. 11.

Body rather robust, not elevated in the dorsal region. Mouth moderate, upper jaw much projecting. Interorbital space slightly convex, 3 in head. Maxillary barbel reaches about to gill-openings. Dorsal spine 2¾ in head; pectoral spine 1½ in head, with six large recurved teeth on inner edge, whose length is about equal to the diameter of the spine; outer edge obscurely serrated. Humeral process indistinct. Adipose fin low, distinctly separated from the caudal. Anal short and elevated.

Color, in spirits, brownish, dark above, becoming lighter behind and below; everywhere punctulate, except on belly.

This species is here described from the original type (No. 29678, U. S. Nat. Mus.), 3¾ inches long. It was taken alive in the mouth of a water snake, by Professors Jordan and Gilbert, in the Big Pigeon River, a tributary of the French Broad, at Clifton, Tenn. It is the only representative of the species known, and may be an abnormal specimen of *N. miurus*. The specimens from Tar River, North Carolina, afterwards referred to this species by Professor Jordan, are large examples of *N. miurus*.

6. *Noturus leptacanthus* Jordan.

*Noturus leptacanthus* "Jordan, MSS, 1876"; Jordan and Copeland, Check List, 160, 1876 (Alabama River, no description); Jordan, Ann. Lye. Nat. Hist. N. Y., vol. XI, 372, 1877 (Alabama River); Jordan, Ann. N. Y. Acad. Sci., vol. I, No. 4, 1877, 119 (Etowah River); Jordan, Man. Vert., 336, 1878 (Alabama and other Southern rivers); Jordan and Brayton, Bull. U. S. Nat. Mus., XII, 55 and 87, 1878 (Alabama and Chattahoochee Rivers); ?\* Hay, Proc. U. S. Nat. Mus., 514 and 515, 1880 (Enterprise, Miss.); Jordan and Gilbert, Syn. Fishes N. A., 98, 1883 (Ga. to Miss.)

*Habitat*:—Alabama, Etowah and Chattahoochee Rivers; ? Enterprise, Miss.

The specimens obtained by Professor Hay may perhaps represent a distinct species.

7. *Noturus gyrinus* (Mitchill) Rafinesque.

*Silurus gyrinus* Mitchill, Am. Mon. Mag., March, 322, 1818; DeKay, Fishes of N. Y., 186, 1842 (Walkill R.; copied.)

*Noturus gyrinus* Rafinesque, Jour. de Physique, 421, 1819; Ich. Oh., 68, 1820; Gill, Proc. Bost. Soc. Nat. Hist., 45, 1862; Cope, Jour. Acad. Nat. Sci. Phila., 237, 1869; Jordan and Copeland, Check List, 160, 1876 (E. Penn. and S. E. N. Y.; no description); Jordan, Ann. Lye. Nat. Hist., vol. XI, 371, 1877 (Southern N. Y. to Penn); Jordan, Bull. Nat. Mus. No. 10, 102, 1877 (S. N. Y. to Penn.); Jordan, Bull. U. S. Geol. Sur., 414, 1878 (S. N. Y. and Penn.; no description); Jordan, Man. Vert., 337, 1878 (S. E. N. Y. and E. Penn. and N. J.); Bean, Proc. U. S. Nat. Mus., 112, 1880 (near Piermont, N. Y.); Hay, Proc. U. S. Nat. Mus., 514, 1880 (Macon, Miss.); Jordan and Gilbert, Syn. Fishes N. A., 98, 1883 (N. Y., entire Miss. Valley, and Upper Lake Region.)

*Schilbeodes gyrinus* Bleeker, Ich. Arch. Ind. Prod., vol. I, 258, 1858.

*Noturus flavus* Jordan, Man. Vert., 303, 1876 (in part); Nelson, Bull. Ills. Mus. Nat. Hist., 50, 1876; Jordan, Proc. Acad. Nat. Sci. Phila., 46, 1877.

*Noturus sialis* Jordan, Bull. Nat. Mus. No. 10, 102, 1877 (Miss. Valley, Great Lake Region, and Red River of the North); Jordan, Bull. U. S. Geol. Sur., 414, 1878 (no description); Jordan, Man. Vert., 337, 1876; Jordan-Rept. on Fishes of Ohio, 801, 1882 (Miss. Valley to Red River of North); Jordan, Bull. Ills. Lab. Nat. Hist., No. 2, 68, 1878 (no description.)

*Habitat*.—New York and Pennsylvania and westward; Red River of the North; Walkill, Hudson, Chemung Ohio, and White Rivers. Pearl R. Miss.

\* "The head is small and narrow, widening gradually from the narrow snout to the shoulders; the lateral outline of the head therefore straight; its length  $4\frac{1}{2}$  times in the body. Upper jaw projecting, *spines rather long and slender*, instead of being short as in the type, the pectoral spine being one-half the length of the head. *The color is quite dark.*" (Hay.)

Table of measurements.

Name of species	N. flavus.		N. classochir. (29677)		N. insignis.		N. mirus.		N. cleatherus. (29678)		N. leptacanthus.		N. gyrinus.	
	Ohio River.		Illinois River.		Susquehanna River.		Tar River.		French Broad.		Etowah River.		Illinois River.	
Locality	Inches and 100ths length.	100ths of length.	Inches and 100ths length.	100ths length.	Inches and 100ths length.	100ths length.	Inches and 100ths length.	100ths length.	Inches and 100ths length.	100ths length.	Inches and 100ths length.	100ths length.	Inches and 100ths length.	100ths length.
Extreme length.....	4.90	19½	4.60	17	4.75	15	4.25	15	2.95	17	2.66	23	3.15	24
Length to base of caudal.....	4.20		4.05		4.00		3.55		2.60		2.30		2.60	
Body:														
Head:														
Greatest height.....														
Greatest length.....		25		25		27		30		28		26		28
Greatest width.....		21		19		20		24		23		18		26
Width of interorbital area.....		6		7		6		7		7		7		13
Length of snout.....		7		9		9		10		9		7		10
Length of maxillary barbel.....		15		10		14		26		18		12		14
Diameter of orbit.....		4		4		4		4		5		3		3½
Dorsal:														
Distance from snout.....		33		34		37		38		35		37		35
Length of base.....		11		13		10		13		12½		11		14
Greatest height.....		11		11½		14		16		16		10		15
Height of spine.....		7		6		8		12		12		7		12
Anal:														
Distance from snout.....		65		61		63		73		68		63		71
Length of base.....		18		23		19½		16		15		18		18
Height at longest ray.....		11½		12		13		12		13		11		16
Caudal:														
Length of middle rays.....		18		16		19		18		20				21
Pectoral:														
Length of spine.....		12		8		15½		19		17		6		15
Ventral:														
Distance from snout.....		49		46		46		51		46		47		48
Length.....		11		10		11		12		14		10		15
Dorsal, number of rays.....		1-7		1-6		1-7		1-6		1-6		1-6		1-7
Anal, number of rays.....		16		16		16		13		11		14		15



## LIST OF NOMINAL SPECIES WITH IDENTIFICATIONS.

Noturus flavus Rafinesque .....	1818	Noturus flavus.
Silurus gyrinus Mitchell .....	1818	Noturus gyrinus.
Noturus luteus Rafinesque .....	1819	Noturus flavus.
Pimelodus insigne Richardson .....	1836	Noturus insignis.
Pimelodus lemniscatus C. & V. ....	1840	Do.
Noturus occidentalis Gill .....	1862	Noturus flavus.
Noturus platycephalus Günther .....	1864	Do.
Noturus marginatus Baird .....	1869	Noturus insignis.
Noturus exilis Nelson .....	1876	Do.
Noturus cleutherus Jordan .....	1876	Noturus elentherus.
Noturus leptacanthus Jordan .....	1876	Noturus leptacanthus.
Noturus mirus Jordan .....	1877	Noturus mirus.
Noturus sialis Jordan .....	1877	Noturus gyrinus.
Noturus elassoichir Swain & Kalb .....	1882	Noturus elassoichir.

INDIANA UNIVERSITY, *November 29, 1882.*

**CATALOGUE OF A COLLECTION OF SAMPLES OF RAW COTTON  
PRESENTED TO THE UNITED STATES NATIONAL MUSEUM BY  
THE INTERNATIONAL COTTON EXPOSITION, ATLANTA, GEOR-  
GIA, 1881.**

By **S. M. INMAN.**

LETTER OF TRANSMITTAL.

INTERNATIONAL COTTON EXPOSITION,  
OFFICE OF THE TREASURER,  
*Atlanta, Ga., April 26, 1882.*

DEAR SIR: Acting under instructions from the Executive Committee of the International Cotton Exposition, I take pleasure in forwarding to the Smithsonian Institution a collection of samples of the foreign cotton recently on exhibition.

\* \* \* \* \*

Very truly yours,

S. M. INMAN,  
*Treasurer.*

Prof. SPENCER F. BAIRD,  
*Washington, D. C.*

CATALOGUE.

U. S. N. M. No.	Locality.	Grade on American standard.	U. S. N. M. No.	Locality.	Grade on American standard.
56, 093	The West Indies ..	Good, fair.	56, 111	Egypt .....	White, fair.
56, 094	Maccios, Brazil .....	Fair.	56, 112	do .....	White, good, fair.
56, 095	do .....	Good, fair.	56, 113	do .....	White, good.
56, 096	Maranham, Brazil ..	Fair.	56, 114	do .....	White, fine.
56, 097	do .....	Good, fair.	56, 115	do .....	Brown, fair.
56, 098	Pernambuco, Brazil ..	Fair.	56, 116	do .....	Brown, good.
56, 099	do .....	Good, fair.	56, 117	do .....	Brown, fine.
56, 100	Paraiba, Brazil .....	Fair.	56, 118	Gallini, Egypt .....	Fair.
56, 101	Rio Grande, Bolivia ..	Fair.	56, 119	do .....	Good, fair.
56, 102	Peru .....	Red.	56, 120	do .....	Good.
56, 103	do .....	Fair, rough. ?	56, 121	do .....	Fine.
56, 104	do .....	Good, fair, rough.	56, 122	Lagos, Africa .....	
56, 105	do .....	Good, rough.	56, 123	Masandaran, Persia.	
56, 106	do .....	Fine, rough.	56, 124	Kaukasus, Persia ..	
56, 107	do .....	Extra quality, rough.	56, 125	Taschkend, Persia ..	
			56, 126	Bucharia, Persia ..	
56, 108	do .....	Fair, smooth. ?	56, 127	Bengal, India .....	Fair.
56, 109	do .....	Good, fair, smooth.	56, 128	do .....	Good, fair.
56, 110	do .....	Good, good, smooth.	56, 129	do .....	Good.