A KEY TO THE ILLINOIS SPECIES OF *ICTALURUS* (CLASS PISCES) BASED ON PECTORAL SPINES

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The species of *Ictalurus* occurring in Illinois can be identified by using diagnostic characters found on the pectoral spine.

Macerated skeletons of the five species of fish comprising the genus *Ictalurus* in Illinois were used in this study. The material at hand consisted of 5 skeletons of *I. furcatus* ranging in total length from 8 to 31 inches; 202 skeletons of *I. melas*, 1 to 13 inches (total length); 20 skeletons of *I. natalis*, 2 to 8 inches (total length); 15 skeletons of *I. nebulosus*, 2 to 8.5 inches (total length); and 61 skeletons of *I. punctatus*, 3 to 26 inches (total length). The articulating end of the pectoral spine from each macerated fish was undamaged and the shaft of the spine was free of skin which permitted examination of the dentations. The terms used to describe the structures on the pectoral spine follow the terminology of Hubbs and Hibbard (1951).

I wish to extend sincere appreciation to Miss Susan M. Lohnes who made the drawings.

Description of the Pectoral Spine

The articular surfaces at the proximal end of the two pectoral spines articulate with the cleithrum and the coracoid (figure 1). Although the anteroventral emargination locks into the pectoral girdle, lateral movement of the spine is still possible.

Dentations are present on the posterior edge of the spine and may be antrorse (directed more or less distad), retrorse (directed proximad) or erect. The anterior edge of the spine may be armed with very fine serrations proximally and weak notches distally. The distal end, or the tip of the spine, is also called the end of the ossification by Hubbs and Hibbard (1951).

Several measurements and ratios were used to show differences between the various species. The *base line of the shaft* is here defined as the straight line formed by the pectoral spine when placed upright on the anterior edge of the spine. The *anteroventral emargination angle* is here defined as the angle formed by a line passing through the anteroventral emargination with the base line of the shaft. This angle appears to be an important diagnostic characteristic in the five species and does not undergo much variation in size due to the age of the fish.

The *ventral process-dorsal articulating surface distance* is the distance of the ventral process through the dorsal articulating surface. The greatest *thickness of the pectoral spine* is the distance through the anterior edge to the posterior edge of the spine across the basal recess. The *width of the dorsal articulating surface* is the distance through the widest part of this surface.

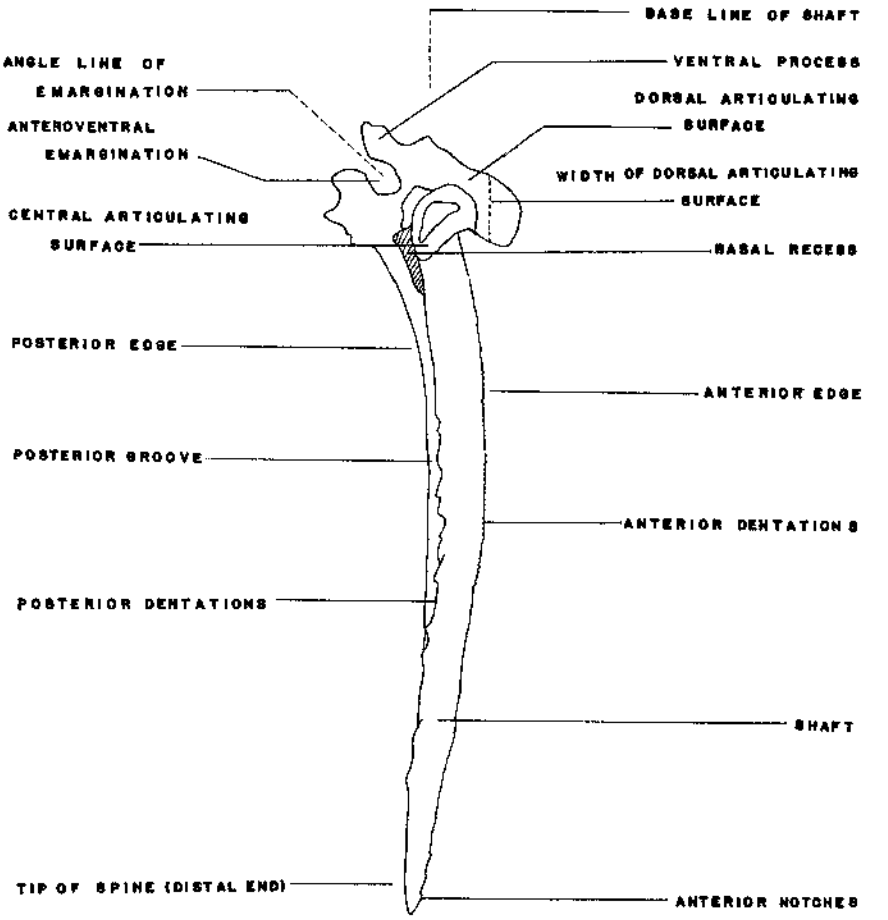

FIGURE 1. Lateral view of a generalized pectoral spine of *Ictalurus*.

Ictalurus punctatus (Rafinesque)

Dentations are present on both anterior and posterior edges of the pectoral spine (figure 2 A). The posterior dentations on the distal two-thirds of the shaft of the spine are retrorse and those on the proximal one-third of the shaft are antrorse. The posterior dentations are in the posterior groove. The anterior dentations are very fine serrations except for one or two small weak notches at the tip of the spine.

The basal recess is large; the length of the recess is greater than the width of the recess. The anteroventral emargination angle ranges between 43°-45°. The ratio of the ventral process-dorsal articulating surface distance to the spine length is 0.20-0.22; ventral process-dorsal articulating surface distance/spine thickness, 0.50-0.51; pectoral spine

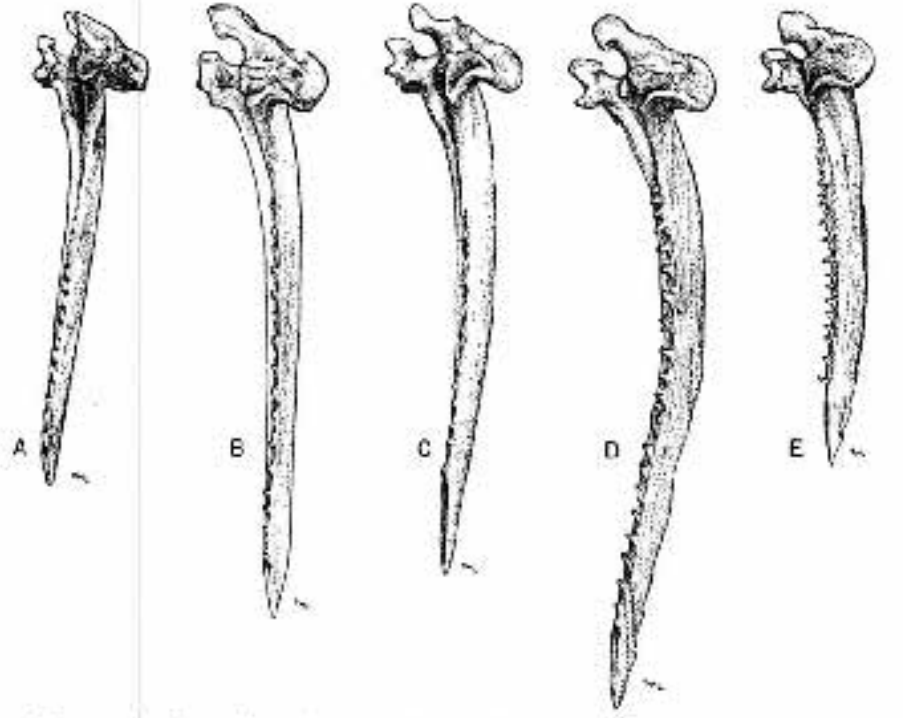

FIGURE 2.—Pectoral spines of (A) *Ictalurus punctatus*, 4x, (B) *Ictalurus furcatus*, 3x, (C) *Ictalurus melas*, 7x, (D) *Ictalurus nebulosus*, 4x, and (E) *Ictalurus natalis*, 8x.

thickness/spine length, 0.10-0.11; dorsal articulating surface width/spine thickness, 0.79-0.80; and dorsal articulating surface width/spine length, 0.12-0.15.

Ictalurus furcatus (LeSueur)

There are no dentations or notches on the anterior side of the spine (figure 2 B). The posterior dentations in the posterior groove are well developed retrorse teeth. The anteroventral emargination angle ranges between 43°-45°.

The ratio of the ventral process-dorsal articulating surface distance/spine length is 0.25-0.28; ventral process-dorsal articulating surface distance/spine thickness, 0.35-0.36; pectoral spine thickness/spine length, 0.07-0.09; dorsal articulating surface width/spine thickness, 0.61; and dorsal articulating surface width/spine length, 0.15.

Ictalurus melas (Rafinesque)

There are no dentations on the anterior side of the spine (figure 2 C), but a weak notch is occasionally present at the tip of the spine. This notch was present in less than 4% of the 404 spines examined.

The posterior dentations are weak and are located along the edge of the posterior groove rather than being in the posterior groove. Forbes and Richardson (1920) state that the posterior edge of the pectoral spine of this species is usually entire or slightly roughened and that 5 to 10 weak teeth occur only in adults. Dentations were present in all specimens examined which included young specimens 1.0 to 2.0 inches (total length). The number of teeth present on the posterior edge varied depending on the size of the fish. In specimens up to 5.0 inches (total length) the number of posterior dentations was 4 to 7. In specimens over 5.0 inches (total length) the number of posterior dentations was 8 to 12.

The anteroventral emargination angle ranged from 60°-65°. The ratio of the ventral process-dorsal articulating surface distance/spine length is 0.20-0.22; ventral process-dorsal articulating surface distance/spine thickness, 0.47-0.48; pectoral spine thickness/spine length, 0.11-0.13; dorsal articulating surface width/pectoral spine thickness, 0.74-0.75; and dorsal articulating surface width/pectoral spine length, 0.14-0.16.

Ictalurus nebulosus (LeSueur)

Dentations are present on both anterior and posterior edges of the spine (figure 2 D). The posterior dentations on the distal one-third of the shaft of the spine are retrorse, those on the middle one-third erect, and those on the upper one-third antrorse. The anterior dentations are very fine serrations except for three or four small weak notches at the tip of the spine.

The basal recess is small, the length of the recess being almost equal to the width of the recess. The anteroventral emargination angle ranged between 34°-36°. The ratio of the ventral process-dorsal articulating surface distance/spine length is 0.24-0.25; ventral process-dorsal articulating surface distance/spine thickness, 0.44-0.47; pectoral spine thickness/spine length, 0.08-0.10; dorsal articulating surface width/spine thickness, 0.74-0.76; and dorsal articulating surface width/spine length, 0.13-0.14.

Ictalurus natalis (LeSueur)

Dentations are present on both anterior and posterior edges of the spine (figure 2 E). The posterior dentations on the distal three-fourths of the shaft of the spine are retrorse and the posterior dentations on the proximal one-fourth of the shaft are antrorse. The anterior dentations consist of very fine serrations except for one or two small weak notches at the tip of the spine.

The basal recess is small, the length of the recess being almost equal to the width of the recess. The anteroventral emargination angle ranged between 34°-36°. The ratio of the ventral process-dorsal articulating surface distance/spine length is 0.27-0.28; ventral process-dorsal articulating surface distance/spine thickness, 0.52-0.57; spine thickness/spine length, 0.13-0.14; dorsal articulating surface width/spine thickness, 0.79-0.80; and dorsal articulating surface width/spine length, 0.17-0.18.

Key to Five Species of the Genus *Ictalurus*

1 A. Dentations present only on posterior side of the spine, or if present on anterior side, consisting of weak notches at tip of spine.... 2

1 B. Dentations present on posterior and anterior sides of spine; dentations on anterior side of spine consisting of very fine serrations; one to four weak notches may be present on anterior side at tip of spine..... 3

2 A. Posterior dentations located in posterior groove; edge of anterior side entire, without notch on shaft; anteroventral emargination angle 45° or less; ventral process-dorsal articulating surface distance/spine length 0.25-0.28; pectoral spine thickness/spine length 0.07-0.09; dorsal articulating surface width/spine thickness 0.61..... .....*Ictalurus furcatus*

2 B. Posterior dentations located on edge of posterior groove; single notch present on anterior side at tip of spine occasionally; anteroventral emargination angle 60-65°; ventral process-dorsal articulating surface distance/spine length 0.20-0.22; pectoral spine thickness/spine length 0.11-0.13; dorsal articulating surface width/spine thickness 0.74-0.75..*Ictalurus melas*

3 A. Basal recess large, length of the recess greater than the width of the recess; one or two notches may be present on anterior side at tip of spine; anteroventral emargination angle 45°; ventral process-dorsal articulating surface distance/spine length 0.20-0.22; pectoral spine thickness/spine length 0.11-0.12 .....*Ictalurus punctatus*

3 B. Basal recess small, length of recess almost equal to width; anteroventral emargination angle 35°; ventral process-dorsal articulating surface distance/spine length 0.24-0.28 4

4 A. Spine slender, pectoral spine thickness/spine length 0.08-0.10; ventral process-dorsal articulating surface distance/spine length 0.24-0.25; ventral process-dorsal articulating surface distance/pectoral spine thickness 0.44-0.47; dorsal articulating surface width/pectoral spine length 0.14; three or four small weak notches present on anterior side at tip of spine....*Ictalurus nebulosus*

4 B. Spine robust, pectoral spine thickness/pectoral spine length 0.14-0.16; ventral process-dorsal articulating surface distance/spine length 0.27-0.28; ventral process-dorsal articulating surface distance/spine thickness 0.52-0.57; dorsal articulating surface width/spine length 0.18; one or two small weak notches present on anterior side at tip of spine.....*Ictalurus natalis*

Literature Cited

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