A Technique for Sexing Channel Catfish

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ABSTRACT

A simple, accurate technique has been devised to sex externally channel catfish, Ictalurus punctatus, regardless of body size or state of gonadal maturation. Male catfish have a single urogenital opening; females have two openings partitioned by a septum—an anterior genital pore, and a posterior urinary pore. In male fish, a single probe can be inserted into the urinary bladder through the urogenital pore. Female fish are differentiated from males by the insertion of two probes, one into the urinary bladder through the urinary pore and the second into the oviduct through the genital pore.

Fish research frequently requires separation of sexes which is difficult or often impossible in immature animals. Selection of brood stock has been primarily based on superficial characteristics. External urogenital structures have been used to sex bluegill sunfish (McComish 1969), and fathead minnows (Flickinger 1969). Various techniques have been used on largemouth bass which include microhematocrit values (Steucke and Atherton 1965), an otoscope (Driscoll 1969), and external structures (Snow 1963; Parker 1971). These techniques are usually applicable only for adult fish.

Casselman (1974) used external characteristics to determine the sex of both mature and immature northern pike. He determined the sex of 3- to 4-month-old fish with 72% accuracy and accuracy was higher in adult fish during the breeding season. Crawford (1957) compared subjective characteristics such as color differences, head development, and vent shape for sex differentiation in channel catfish (Ictalurus punctatus). Meyer et al. (1973) described external structural differences in genitalia of sexually mature catfish. However, experienced culturists of catfish have difficulty using these characteristics to accurately determine the sex of immature animals.

We devised a new technique to increase the accuracy of externally sexing channel catfish, regardless of body size, sex, or state of gonadal maturation. This method can be used quickly and easily in the field or laboratory, and involves minimal handling stress to the animal.

METHODS

Channel catfish from cultured and wild stock were examined to determine structural differences of males and females. The fish examined ranged from small fingerlings to adults (7.6–600 g, 9–39 cm total length). A dissecting microscope and probes were the only equipment required; on large fish a magnifying glass could be substituted for the microscope. Small probes (0.5–1.5 mm diameter) were made from sewing needles; the sharp end was inserted into a small cork which served as a handle, and the blunt end was used as the probe. Fish were wrapped in a wet cloth, and examined with the probe under a dissecting microscope. With prac-
practice, less than one minute per fish is required using the following procedure.

1. Position the fish ventral side up.
2. Locate the anterior median ridge at the base of the anal fin. This is the starting position for probe insertion.
3. Gently move the probe cephalad, in the median plane, and carefully insert the probe at a 45° angle through the opening circumscribed by a convoluted papillary structure (Fig. 1). The probe inverts the papilla and inserts directly into the urinary bladder (Fig. 2).
4. Examine carefully the genital area between the anal opening and the papilla. In males there is no external pore between the papilla and the anal opening (Fig. 2). In females a genital pore is present and a second probe can be inserted at a 45° angle through this opening into either ovary (Fig. 2).

RESULTS AND DISCUSSION

This technique was used to sex 187 females and 148 males and results were verified by autopsy. Errors were made on two males and one female; two of these probably re-
resulted from haste during the early stages of perfecting the technique, and the third fish, a male, exhibited an anomaly of the genitalia.

A papilla opening into the urinary bladder is present in both male and female channel catfish and is posterior to the anal opening. In females a second opening, a genital pore, is located between the anus and the urinary papilla and is separated from the urinary papilla by a membranous septum. The region surrounding this middle opening is prominent in large female fish and appears flaccid; with gentle probing the opening frequently dilates, aiding in rapid positive identification. In contrast, the male urogenital papilla exhibits a firm appearance with tight antero-posterior folds of tissue between the anus and the urogenital papilla. In general, the posteriormost portion of the urogenital region of the male is narrower (Fig. 1). A probe introduced through the female genital pore will always insert to a greater depth into either ovary than the probe inserted into the bladder (Fig. 2). It is necessary to insert both probes into the female to clearly observe the two openings separated by the septum; this is particularly important in small fish. The male in which we failed to identify the sex, had a pocket-shaped septum with tiny openings leading into the testes; however, the anterior probe could not be inserted deeper than the probe in the bladder. The frequency of this urogenital anomaly is not known.

Hunn and Allen (1974), employing techniques developed for trout, placed catheters in the urinary bladder of six male and two female channel catfish. The authors did not describe any differences between male and female urogenital structures. We examined the urinary and genital tracts in rainbow trout and found that the morphology differs from channel catfish in that both sexes have a single, external urogenital opening.

Anesthesia was not necessary, and small fish were easily handled by one person; however, larger fish (200 g or more) required a second person to hold the fish. Care should be taken to keep fish immobile to prevent accidental rupture of the bladder. If the fish thrashes its tail, the probe should be immediately released; muscular contraction will expel the probe and prevent rupture of the bladder. The high degree of accuracy and the simplicity of equipment make the sexing technique presented here a practical, useful tool.

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LITERATURE CITED


