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Ichthyology 4453

Literature Review of Alligator Gar



Atractosteus spatula

ABSTRACT

The Alligator Gar (*Atractosteus spatula*) is one of the more primitive fish found throughout the southeastern United States. This predatory fish is characterized by a long body, rounded tail, and a triangular snout that contain a double row of teeth on the upper snout. Alligator Gars are the largest gar species of the family Lepisosteidae. These fish are considered to be top predators and opportunistic feeders, feeding on anything available to them. Other species of gar have been documented to breed with Alligator Gars, producing hybrids. However, populations are somewhat in decline due to lack of regulation and loss of habitat.

CONTEXT AND CONTENT

Kingdom - Animalia

Family – Lepisosteidae

Phylum - Chordata

Genus – *Atractosteus* (or *Lepisosteus*)

Class – Actinopterygii

Species - *spatula*

Order – Lepisosteiformes

The genus *Lepisosteus* is broken into two parts in Greek for "scale-bone". The genus *Atractosteus* is only broken into one part meaning "arrow".

GENERAL CHARACTERISTICS

The Alligator Gar is not only the largest of the gar species, but also one of the largest of North American freshwater fishes (Buckmeier 2008). It is the largest of the freshwater fish found throughout the draining rivers of the Gulf of Mexico drainage (Mendoza et al. 2002). These fish are believed to derive from a group of ancient fish; possibly much older than present day teleosts going as far back 180 million years ago to the Cretaceous period (Alfano et al.

2008). Smaller Alligator Gars, approximately fifteen millimeters in length, can be identified from other gar species by a light colored arrow found on the dorsum of the snout. Other characteristics include a long, cylindrical body with an obvious rounded tail, an elongated and triangular snout, and small primitive eyes (Chivers 2005). The mouth of the Alligator Gar is the key characteristic differentiating the Alligator Gar from other gar species. Double rows of teeth reaching an inch or longer are found on the upper bill of the snout (Chivers 2005; Larson 2005). The scales make up an armor-like shell, which is covered with ganoine (Larson 2005). These fish are capable of living to fifty years and growing to the lengths of nine feet, and even reach weights as much as three hundred pounds (Chivers 2005). Alligator Gars are not social fish; the only instance in which they show any social behavior occurs during spawning (Mendoza 2012).

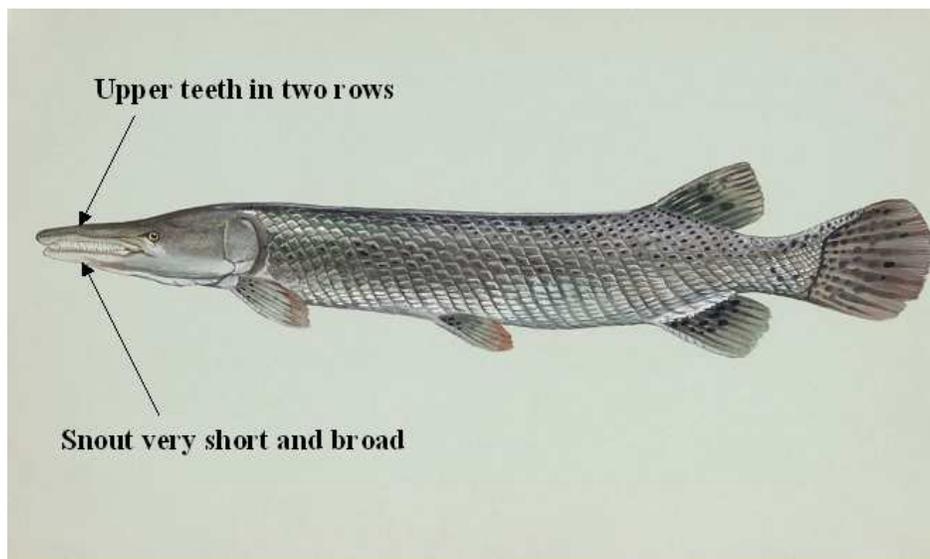


Figure 1.0: General body form and characteristics of *Atractosteus spatula*.

Source: <http://www.wildlifedepartment.com/fishing/fishid/alligatorgar.htm>

DISTRIBUTION

Alligator Gar can be found in North America, Central America, and Cuba (Mendoza et al. 2008). Fourteen states of North America, including Alabama, Florida, Mississippi, Oklahoma, and Texas, contain Alligator Gar; however, in some areas, these fish are very rare and may even be extirpated (Buckmeier 2008). Drainages include the Gulf of Mexico and the Mississippi River.

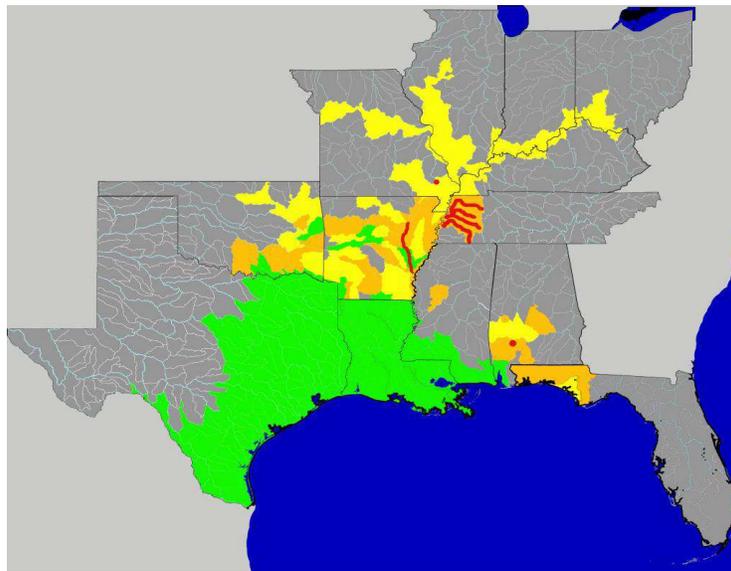


Figure 2.0: *A. spatula* distribution in North America.

Source: US Fish and Wildlife Service

FAMILY AND ORDER

The family Lepisosteidae contains two genera. The genus *Lepisosteus* contains four species, *Lepisosteus oculatus* (spotted gar), *Lepisosteus osseous* (longnose gar), *Lepisosteus platostomus* (shortnose gar), and *Lepisosteus platyrhincus* (Florida gar) (Alfaro 2008). The genus *Atractosteus* contains three species, which consist of *Atractosteus spatula*, *Atractosteus tristoechus* (Cuban gar), and *Atractosteus tropicus* (tropical gar) (Alfaro 2008).

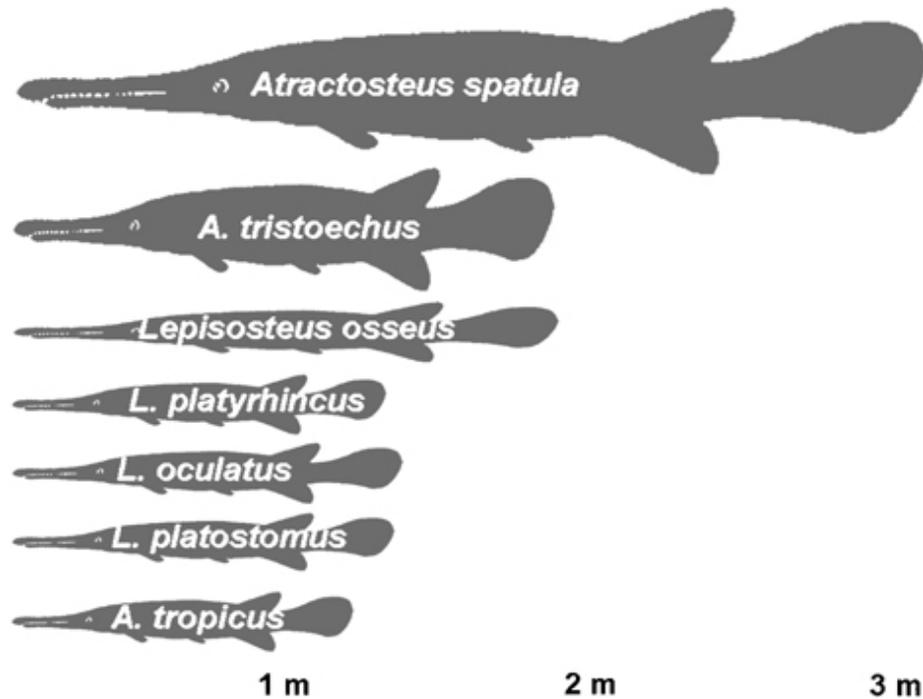


Figure 3.0: Size comparison of family Lepisosteidae in meters.

Source: Mendoza 2012.

BEHAVIOR AND REPRODUCTION

Alligator Gars typically spawn in the United States in the late spring and early summer, during the months of April through June (Buckmeier 2008). Spawning can last six to seven days. Spawning occurs in large river floodplains and along the vegetated edges of lakes and tributaries (Alfaro 2008; O'Connell 2007). These areas give young Alligator Gar protection from other predators in the surrounding area. Large spawning groups of Alligator Gar are known to divide into smaller groups with two to eight males and one female (Alfaro 2008). Spawning is the only known instance in which Alligator Gar show aggressive behavior, typically in males (Mendoza 2012). The females can produce up to 400,000 eggs per year (Mendoza 2002). The eggs are typically large (Aguilera 2002). The eggs of the Alligator Gar contain toxic substances, which

may serve as defensive purposes (Aguilera 2002). The larvae undergo an extended yolk sac period (Aguilera 2002). Once the females lay their eggs, the eggs are anchored to surrounding vegetation (Aguilera 2002).

These fish also have a high digestive tract maturation rate (Alfaro 2008). The digestive tract is formed completely when young gar begin feeding. (Mendoza 2002). This is one reason young gar have a rapid growth rate and are constantly in search of prey (Alfaro 2008).



Figure 4.0: Eggs produced from *A. spatula*.

Source: <http://natgeotv.com/ca/webisodes/web-shows/monster-fish?videoId=11923753>

ECOLOGY

Alligator Gars are considered to be top predators and opportunistic feeders (Alfaro 2008; Aguilera 2002). The diet of Alligator Gar includes fish, such as mullet and catfish, in addition to amphibians, crustaceans, mammals, reptiles, and waterfowl (Chivers 2005; O'Connell 2007). Birds, invertebrates, and even fishing tackle have been found in the stomachs of these large fish (Buckmeier, 2008). They are thought to prey on more valuable or sport fish; but that is not the case. These fish are known to grab and manipulate prey they feed (Larson 2005). Alligator Gar may damage trawls and gillnets throughout freshwater and estuarine habitats (O'Connell, et al. 2007).

GENETICS

The sex of a mature Alligator Gar cannot be determined by looking at external anatomy. Internal anatomy, such as the gonads, must be examined (Alfaro 2008). Due to the mistakes often associated with misidentifying the sex of Alligator Gars, an alternative method of gender identification is allowing the fish to develop to tell the difference. Plasmatic vitellogenin can be used for gender identification because it is only found in female fish (Mendoza 2012).

There have been cases of hybrids being produced between different gar species. The longnose gar (*Lepisosteus osseus*) and the Alligator Gar are the first known species to produce such hybrids (Herrington, et al. 2008). This hybridization is also possible with shortnose gars (*Lepisosteus platostomus*) (Herrington et al. 2008). The hybrid offspring possess characteristics of Alligator Gar parents, such as the length of the snout and the double rows of teeth found on the top jaw (Herrington et al. 2008). Hybridizations with Alligator Gars also include pairings with spotted gars (*Lepisosteus oculatus*). There have been albino alligator gars documented.



Figure 5.0



Figure 5.1



Figure 5.2



Figure 5.3

Figure 5.0: Hybridization between Alligator Gar and Longnose Gar.

Source: <http://www.sulit.com.ph/index.php/view+classifieds/id/7646444>

Figure 5.1: Hybridization between Alligator Gar and Shortnose Gar.

Source: <http://kolkata.olx.in/19-20-inch-shortnose-alligator-gar-pair-for-sale-iid-466907470>

Figure 5.2: Hybridization between Alligator Gar and Spotted Gar.

Source: <http://www.arofanatics.com/forums/showthread.php?p=8482576>

Figure 5.3: Albino Alligator Gar.

Source: http://www.totalfisherman.com/alligator_gar.html

FORM AND FUNCTION

The Alligator Gar is known to rise to the water's surface to gulp air. This is due to its swim bladder, which is made up of a network of fine blood cells that allow it to act as a lung (Chivers 2005). This adaptation allows Alligator Gar to breathe in aquatic environments that may experience low concentrations of dissolved oxygen (Larson 2005).

CONSERVATION

Some research pertaining to Alligator Gar suggests that populations may be in decline due their late sexual maturation (Buckmeier 2008). However, Alligator Gar and many other

Lepisosteid species in North America have also been in decline because of alterations and loss of habitats, and commercial and sport fishing (Alfaro 2008). Lack of regulation on the harvest of Alligator Gar is another reason for the decline of this species (Mendoza 2012). In the United States, two Fish and Wildlife Service national fish hatcheries and one regional fisheries center are currently working on efforts to restock populations of Alligator Gar (Alfaro 2008). The Private John Allen National Fish Hatchery in Tupelo, Ms, works to collect spawning Alligator Gar caught in the wild to assist in re-stocking efforts (Alfaro 2008). The Conservation Genetics Lab at the Warm Springs Regional Fisheries Center in Warm Springs, Ga, is developing a microsatellite library is to study genetic relationships of these fish from different areas in which they are located (Alfaro 2008).

ACKNOWLEDGMENTS

First, I would like to thank my Ichthyology professor, Eric Dibble, and teaching assistant, Clint Lloyd. I would also like to acknowledge and thank Salvador Mondragon, Fisheries Management Biologist of the Missouri Department of Conservation, and Christopher J. Kennedy, Fisheries Regional Supervisor of the Missouri Department of Conservation, for their response and information given to aid this literature review.

REMARKS

It has been noted that Alligator Gar scales were once used by Native Americans as arrowheads (Larson 2005). Nicknames of the Alligator Gar include the “Cajun barracuda” and the “Arkansas tuna” (Chivers 2005). The Mississippi record Alligator Gar was caught by Kenny Williams from Lake Chotard, Ms. The record Alligator Gar mount is currently being held at the Natural Science Musuem in Jackson, Ms. The large female weighed in at approximately 327 lbs.

The length was measured at 8 feet 5 inches. Age has been estimated using the otoliths of the gar at ninety-five years or plus.



Figure 6.0



Figure 6.1

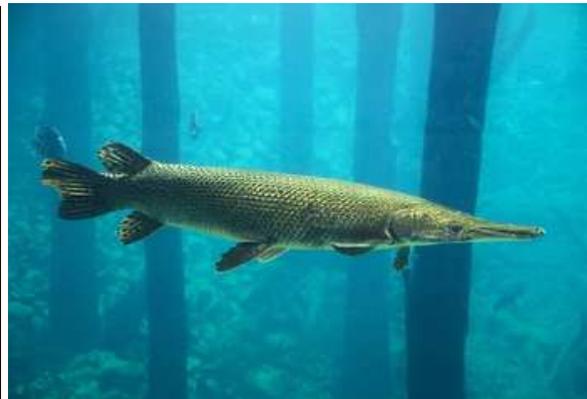
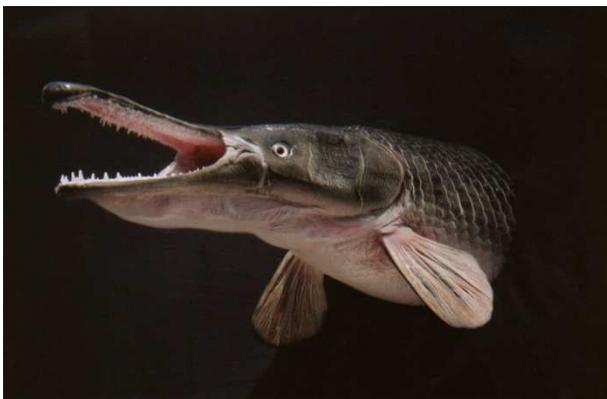
Figure 6.0: Mississippi record Alligator Gar.

Source: <http://www.ma-rooned.com/2011/02/news-of-eeeeeyikes.html>

Figure 6.1: Mississippi State University Ichthyology professor Eric Dibble, teaching assistant Clint Lloyd, and the Spring 2013 Ichthyology class with the Mississippi Alligator Gar record mount.

Source: Melanie Parker

IMAGES



Adult Alligator Gars in the above figures.

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