

**Piranha 3D.** Alexandre Aja (director). 2010. The Weinstein Company, Dimension Films. 89 min.—Continuing the scholarly investigations of its much cited and much viewed predecessors, *Piranha* (1978, Joe Dante, Director) and *Piranha, Part Two, The Spawning* (1981, James Cameron, Director), *Piranha 3D* is an excellent documentary on an important and historic discovery in ichthyology. The documentary takes place in Lake Victoria, Arizona in the spring of an unidentified year (undisclosed perhaps due to the large amounts of unpublished data this film introduces). Like its much more famous counterpart in Africa, this Lake Victoria is part of a rift valley in a clearly marked (but previously unknown) “Mesolithic dig” site.

The opening scene of this film shows remarkable footage of an underwater earthquake that frees what we later learn is a “prehistoric lake” found directly beneath the modern lake. What lies beneath are the film’s extraordinary protagonists. In an homage to another ichthyological documentary, *Jaws* (1975, Steven Spielberg, Director; which led to the formation of the American Elasmobranch Society), this opening scene includes a cameo by the famous scientist, Richard Dreyfuss.

In exploring the newly exposed habitat, members of a USGS (United States Geological Survey) survey team make an amazing but deadly discovery. Surviving for nearly two million years in complete darkness, without food (except themselves), and in complete isolation is a species of undiscovered piranha. This new record is the most northerly distributed characiform in North America, and a serrasalmin like no other. During one of the film’s most revealing sequences, a local aquarist/ichthyologist (Mr. Goodman, not listed as an ASIH member) misidentifies the fish as *Pygocentrus nattereri* (the well known red-bellied piranha), and produces a remarkably well-preserved Pleistocene fossil (even more remarkable is the fact that this happens to be the only fossil he owns). Both fossil and extant specimens are clearly new to science and should be described more formally. The piranha specimens in this film range from roughly 400 mm to nearly a meter in standard length. Near the very end of the film we learn that these specimens are only juvenile stages. Mr. Goodman has discovered (apparently without aid of dissection or any lab equipment to speak of) that these piranhas “lack adult reproductive organs.” We catch only a momentary glimpse of an adult in the documentary’s last scene. This adult specimen appears for less than a full second but it appears to be a voracious carnivore that can leap out of the water at great speeds and with the accuracy of individuals of *Carcharodon* hunting seals in South Africa.

Cranial and dental morphology and behavior indicate that these are serrasalmins, and suggest that they are phylogenetically related to *Pygocentrus*. Postcranially, however, the morphology is unlike any ostariophysan (or most any other actinopterygian) and further research will be needed to place it. If they are related to *Pygocentrus*, the elongate body and caudal peduncle indicate that significant heterochrony must have occurred in the evolution of this species and in a way that cannot be explained by earlier works on the subject (Fink, 1993; Machado-Allison and Fink, 1995; Zelditch and Fink, 1995). Additional features of interest include laterally flaring the operculum as in some cichlid taxa as a territorial

warning, and withdrawal of oral epithelium exposing the jaw teeth as a prelude to an attack. Also included among the large number of incredible morphological and behavioral features of these fish are a pair of strange glowing red eyes that must be a result of their long subterranean existence.

Reproduction is also documented in the film. The observations of fishes include a remarkable scene in which we see that even *in ovo* the larval form of these fish have fully developed and fully functional teeth. Also extraordinary is that the eggs are found in 3 to 5 meter high stalks, each containing hundreds of developing individuals. Whether these are from a single female or a group clutch is unclear. The ability to belch loudly also points to these fish having perhaps the ability to communicate via sound, as has been documented in other characins (e.g., the croaking tetra, *Glandulocauda*, see Nelson, 1964).

The diet of the new piranha is also unusual in that they appear to not only attack and consume humans but to actively seek out scantily clad to fully naked individuals. The best protection against these man-eaters appears to be a healthy covering of loose fitting clothing. Researchers interested in studying this taxon should be aware that most individuals with more than 20% body covering seem to survive attack and should therefore dress appropriately. The piranhas in this documentary did have an unusual aversion to several important potential food items: (a) old people, (b) ugly people, (c) smart people, (d) male genitalia, and (e) breast implants.

Lake Victoria should perhaps be considered by the ASIH planning committee as a potential venue for a future JMIH meeting. Given the large number of enthusiastic (if only when inebriated and nearly naked) young people in this movie it would be a perfect location to recruit future ichthyologists and herpetologists. In conclusion, *Piranha 3D* is a fantastic and informative nature documentary that should inspire many years of research. We look forward to a sequel.

#### LITERATURE CITED

- Fink, W. L. 1993. Revision of the piranha genus *Pygocentrus* (Teleostei, Characiformes). *Copeia* 1993:665–687.
- Machado-Allison, A., and W. L. Fink. 1995. Sinopsis de las especies de la subfamilia Serralminae presentes en la cuenca del Orinoco. Claves, diagnosis e ilustraciones. Series Peces de Venezuela. Universidad Central de Venezuela.
- Nelson, K. 1964. The temporal patterning of courtship behaviour in the glandulocaudine fishes (Ostariophysi, Characidae). *Behaviour* 24:90–146.
- Zelditch, M. L., and W. L. Fink. 1995. Allometry and developmental integration of body growth in a piranha, *Pygocentrus nattereri* (Teleostei: Ostariophysi). *Journal of Morphology* 223:341–355.

Prosanta Chakrabarty, *Museum of Natural Science, Louisiana State University, Baton Rouge, Louisiana 70803; E-mail: prosanta@lsu.edu.*

William L. Fink, *Museum of Zoology, University of Michigan, Ann Arbor, Michigan 48109; E-mail: wfink@umich.edu.*