

A New Technique for the Safe Capture and Transport of Crocodilians in Captivity

RAYMOND A. SAUMURE*

BRIAN FREIERMUTH

JEFFREY JUNDT

LARRY ROWLETT

and

JACK JEWELL

*Shark Reef at Mandalay Bay, 3950 Las Vegas Boulevard South
Las Vegas, Nevada 89119, USA*

**Additional affiliation RAS: Department of Natural Resource Sciences
McGill University, 2111 Lakeshore Road, Ste-Anne-de-Bellevue
Québec, H9X 3V9, Canada
e-mail: insculpta@hotmail.com*

The capture of crocodilians involves a certain amount of stress to both the animals and handlers. A variety of methods are currently employed to capture crocodilians. Specimens deemed too large to be captured safely by hand are typically noosed with ropes or catchpoles (Fowler 1995; Jones and Hayes-Odum 1994). Noosed specimens may thrash and twist about violently and/or roll in an attempt to free themselves, which risks injury to the individual, nearby crocodilians, and/or the handler (Fowler 1995). Minor injuries (e.g., abraded snouts, broken teeth) to display animals are aesthetically undesirable. Extensive physical exertion also leads to the accumulation of lactic acid in the blood, which can have negative and even fatal consequences in larger specimens (Seymour et al. 1987). The use of cylinders for trapping and/or restraining crocodilians has been previously described. Jones and Hayes-Odum (1994) used an open PVC pipe for securing large noosed Ameri-

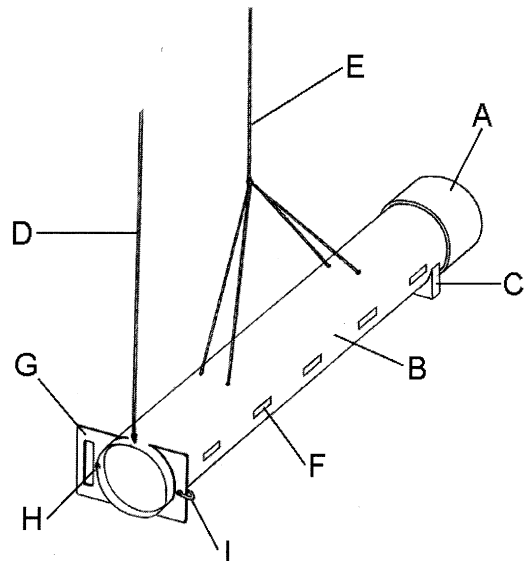


FIG. 1. Schematic diagram of the Crocodilian Capture Tube: (A) PVC cap; (B) PVC pipe; (C) stabilizer foot; (D) capture rope; (E) load bearing ropes; (F) drainage slits; (G) door; (H) door stopper bolt; (I) carabiner door latch.

can alligators (*Alligator mississippiensis*). This technique, however, still requires that the crocodilian be noosed with ropes, pulled into, and secured to the pipe. Wright (1999) advocated a similar approach, but with a corrugated metal sewer pipe. The objective of this paper is to describe a simple crocodilian capture method that provides an alternative to noosing in clear water pools possessing distinct corners and/or edges.

A piece of lime-green drainage pipe was used as the basis for our Crocodilian Capture Tube (Fig. 1). Although the effects of pipe coloration on trapping efficiency were not tested, it was felt that green was a more natural color than white. Pipe dimensions corresponded to the size of the crocodilians being captured. At Shark Reef, the tube is used to capture 5 year old captive bred *Crocodylus porosus* x *siamensis* with total body lengths ranging from 1.62 to 1.92 m and maximum abdominal diameters of 0.17–0.20 m. The pipe is 1.83 m in length, with a diameter of 0.36 m, thickness of 0.01 m, and mass of 34 kg (14-inch schedule 40 PVC pipe). As captive specimens are sometimes obese, pipe diameter should be carefully considered. A ratio of crocodilian girth to pipe diameter of $\geq 1:1.8$ proved sufficient for our juvenile specimens. A commercially available white PVC cap (Fig. 1) was secured to one end of the pipe with PVC glue. A PVC stabilizing foot (Fig. 1), comprised of a U-shaped cradle, was then glued to the bottom of the pipe to ensure the trap would not roll once deployed on a relatively flat surface. This foot was affixed closest to the cap end of the pipe. This ensured that the entrance to the pipe would be almost flush with the bottom of the exhibit. Five holes were drilled into the top of the pipe in order to attach both capture and load-bearing ropes (Fig. 1). Drainage grooves were also cut along both sides of the pipe at intervals ranging from 0.15 to 0.35 m. In order to reduce stress to the captive animal, some water is allowed to remain in the pipe by cutting the grooves 0.13 m up from the bottom of the pipe. The remaining water, however, slowly seeps out from around the pipe's door. The entrance end of the pipe was modified to accommodate a sliding door (Fig. 1). The door is constructed as follows: A groove is cut around the end of the pipe, except for two 0.09 m sections on the top and bottom of the round pipe, in order to allow the insertion of a gray PVC door panel. Attached to the door is an imbedded stopper, comprised of a protruding stainless steel nut and bolt (Fig. 1).

A hole is drilled into the opposite end of the door that permits the clipping of an aluminum mountaineer's carabiner for a secure, tight-fitting, door that cannot be pushed out by the captive crocodilian's tail (Fig. 1). As a wet PVC door has the potential to be difficult to hold and maneuver quickly, the door also has a large integrated handle (Fig. 1). The total cost for the in-house manufacture of the Crocodilian Capture Tube with all new components is < US\$ 400 at the time of writing. The most expensive component was the PVC cap at US\$ 212. A new 6 m length of PVC pipe costs US\$ 170. Such an expense is justifiable because of the safety afforded to the staff and the crocodilians.

The Crocodilian Capture Tube is used as follows: The tube is submerged to the bottom of an exhibit pool and up against an edge (Fig. 2A). Pool edges help to guide the crocodilian into the mouth of the tube. The trap is then left in place without further disturbance for ± 15 minutes, thus allowing crocodilians the opportunity to settle onto the bottom of the tank. The target crocodilian is then gently nudged with a smooth ended pole in the direction of

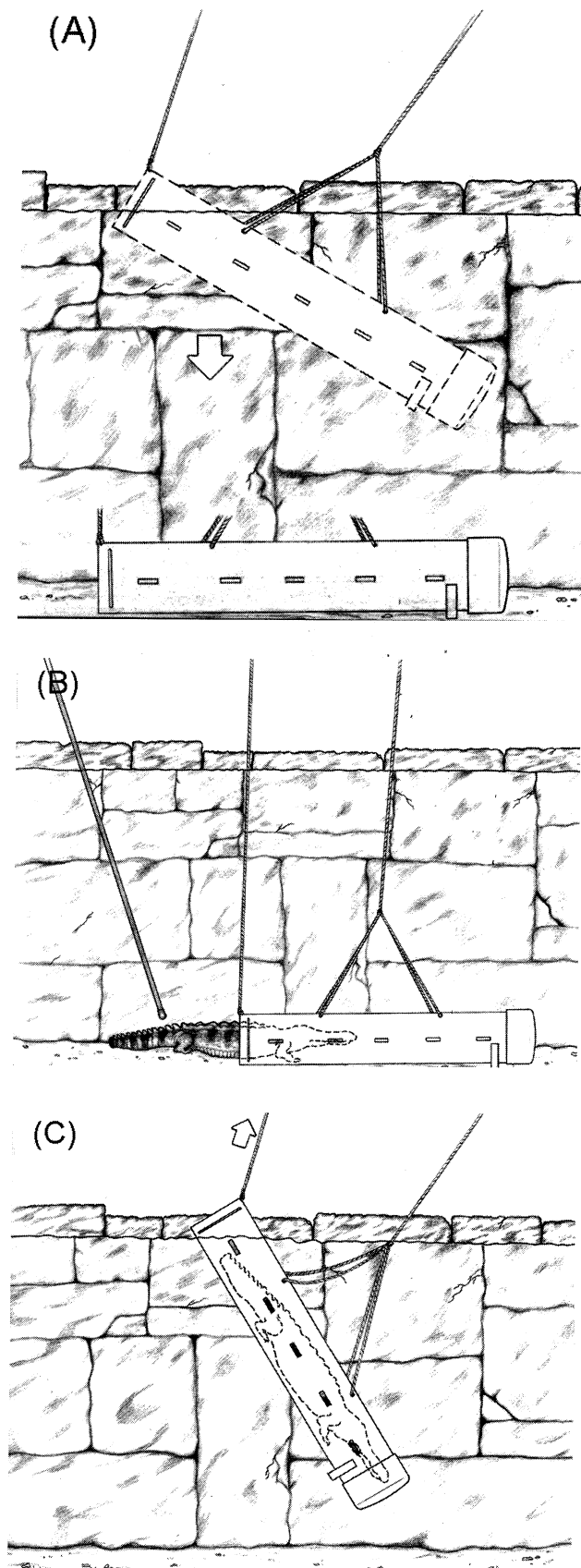


FIG. 2. Deployment and use of the Crocodilian Capture Tube from the edge of a deep concrete exhibit pool with clear water: (A) positioning tube at bottom of exhibit along an edge; (B) prodding crocodilian into the tube; (C) quickly retrieving entrance end of pipe by pulling up on the capture rope.

the tube entrance (Fig. 2B). To elicit movement in the desired direction, prodding is best directed towards a crocodile's posterior (e.g., base of tail, thigh) (pers. obs.). Our crocodilians bite at poles that approach or come in contact with their heads, rather than move in the desired direction. Juvenile *Crocodylus porosus* $\times$ *siamensis* entered the pipe readily, and most captures were accomplished in < 5 minutes. Once a crocodilian enters the pipe, the entrance side is quickly pulled up and out of the water by means of an attached capture rope (Fig. 2C). The crocodile is thus momentarily in an inverted vertical position and is unable to back out of the smooth, water-filled, pipe. The entrance is quickly sealed with the sliding door and secured. Finally, the pipe is pulled completely out of the water by means of the second load bearing rope handle (Fig. 1; Fig. 2C). Drainage slits allow water to quickly drain from the pipe (Fig. 1). The crocodile is then safely contained in a dark, wet, and smooth pipe. We believe that these characteristics provide a relatively non-stressful environment for the animal and prevent physical injury. A minimum of two people are required to trap a juvenile crocodilian in this fashion, although more may be required to lift and transport the pipe and its occupant. At Shark Reef, the entire process takes place with staff standing along the edge of an eight-foot deep exhibit pool. Although this technique reduces stress during capture and transport, confined crocodilians should not be exposed to excessively warm areas and/or direct sunlight, as thermal stress can also be fatal. To release a crocodilian, the pipe entrance is simply oriented towards a body of water and the door is removed. Tilting the pipe causes the crocodilian to slide out tail first into the water.

The Crocodilian Capture Tube has many advantages over current capture methodologies: (1) No direct physical contact is required between the crocodilian and handlers; (2) there is no need for securing the crocodilians jaws; (3) specimens can be captured underwater with ease; (4) no stressful thrashing or rolling behavior is exhibited by captured crocodilians; (5) there is no longer a need to cover a crocodilian's eyes, as it is in a dark tube; (6) the device serves as a safe short-term holding and on-site transport container; (7) no sedatives are required to capture and/or transport an animal; and (8) the crocodilians body is evenly supported during transport.

Acknowledgments.—We thank Adam Britton, Andy Odum, and one anonymous reviewer for helpful comments on earlier drafts of this manuscript. We would also like to thank Michael Eaton for the splendid illustrations. Finally, we acknowledge Christopher Blonar for his help in obtaining an elusive reference.

LITERATURE CITED

- FOWLER, M. E. 1995. *Restraint and Handling of Wild and Domestic Animals*. 2nd ed. Iowa State University Press, Ames, Iowa. 383 pp.
- JONES, D., AND L. HAYES-ODUM. 1994. A method for the restraint and transport of crocodilians. *Herpetol. Rev.* 25:14–15.
- SEYMOUR, R. S., G. J. W. WEBB, A. F. BENNETT, AND D. F. BRADFORD. 1987. Effects of capture on the physiology of *Crocodylus porosus*. In G. J. W. Webb, S. C. Manolis, and P. J. Whitehead (eds.), *Wildlife Management: Crocodiles and Alligators*, pp. 253–257. Surrey Beatty & Sons, Sydney.
- WRIGHT, K. M. 1999. Reptiles – Crisis management protocols. In Chan, Baker, and Guerrero (eds.), *Resources for Crisis Management in Zoos and Other Animal Care Facilities*, pp. 353–356. American Association of Zoo Keepers, Topeka, Kansas.