

SCAVENGING BEHAVIOR OF THE AQUATIC EASTERN HELLBENDER SALAMANDER (*CRYPTOBRANCHUS ALLEGANIENSIS*) IN NORTH CAROLINA

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Abstract: Vertebrates may scavenge, or utilize carrion resources more than has been widely assumed (Devault et al. 2003). While documentation of scavengers in terrestrial and marine systems has received increased attention (Beasley et al. 2015; Davenport et al. 2016), little is known regarding scavengers in freshwater stream systems. Dominant fully aquatic salamanders are important foragers in these systems and may rival the biomass of predatory fish species (Davic and Welsh 2004). One fully aquatic salamander in Appalachian streams, the eastern hellbender (*Cryptobranchus alleganiensis*), occurs in NC streams which receive potentially large seasonal influxes of hatchery reared trout (NCWRC 2017). Moreover, few reports exist in the published literature on the food preferences of eastern hellbender salamanders. While hellbender diet is comprised of 90% crayfish based on stomach content analysis (Peterson et al. 1989), a small portion of their diet is thought to include fish or fish bait (Nickerson and Mays 1973). Barring a few anecdotal reports from fisherman, little is known regarding scavenging by hellbenders in NC.

Key Words: Amphibians; scavenging ecology; salamander diet; trout; Cryptobranchidae.

On 30 June 2016, I conducted a 15 min passive snorkel survey in a 50 m length stream reach in a tributary of the French Broad River, Transylvania Co., NC, U.S., known to contain resident hellbender populations (Unger unpubl. data). This survey was conducted to confirm no hellbender individuals were actively foraging prior to camera deployment. Immediately following the snorkel survey, I placed 2 brook trout (*Salvelinus fontinalis*) carcasses (<24 hr deceased and obtained from a local hatchery) in the stream reach, each adjacent (~25 cm) to 1 Go-Pro underwater camera secured to a dive weight at a depth of 57 cm. Carcass 1 (24 cm total length) was secured to the stream substrate with an aluminum tent stake run through the trout carcass eye socket while carcass 2 (17.8 cm total length) was positioned freely resting on the stream substrate. Cameras were deployed for a total of 1 hr and video was reviewed to determine occurrence of scavenging.

Within 10 min of carcass 1 being deployed, 1 adult hellbender (approximately 430 mm) approached from downstream, first attempting to bite the tail end of the trout, and then subsequently wrapping itself around the carcass in an apparent attempt to free the carcass. Within 5 min of this observation, this same adult *C. alleganiensis* was filmed nudging carcass 2, initially biting once, followed by a series of 7 buccal suction feeding gulps, completely consuming carcass 2 within 30 sec (Fig. 1A). Within 5 min of this event, an additional hellbender (approximately 450 mm) was documented exploring carcass 1. This

hellbender initially nudged the carcass, then attempted a lateral bite, and after approximately 3 min bit carcass 1 on the head and straddled the carcass momentarily (Fig. 1B). After an additional 2 min, this salamander moved away with the carcass left intact.

These observations provide the first direct evidence and video documentation of scavenging and consumption of a brook trout carcass by wild hellbenders in NC, a state with high trout stocking (~6 million statewide with >15,000 annually in this stream; NCWRC 2017). The potential implications of trout stocking for *C. alleganiensis* are unclear. Presently, there is no evidence or research examining the potential benefit of trout carrion to act as a food resource to adult hellbenders in relation to other preferred prey, such as crayfish. Moreover, ecological interactions between trout and hellbenders in Appalachian streams are likely complex, since trout are potential competitors of adult hellbenders or potential predators of larval hellbenders.

Collectively, these observations support the feasibility and effectiveness of underwater baited cameras as a means of studying scavenging behavior in this normally elusive salamander. Preliminary trials using baited cameras in other Appalachian streams have demonstrated crayfish and fish investigating and partially scavenging trout carcasses within 10 min of their placement in streams (Unger unpublished). Future work should focus on the time intervals required by various scavengers to detect carcasses, number of aquatic scavengers in relation

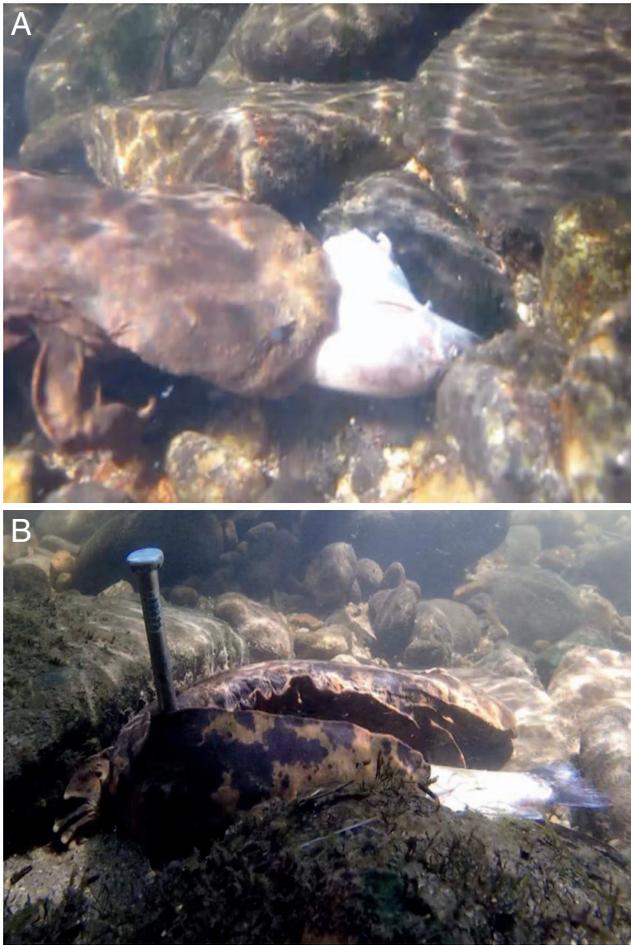


FIG. 1. A) *Cryptobranchus alleganiensis* adult consuming trout carcass 2; B) different individual *C. alleganiensis* straddling trout carcass 1.

to carcass decomposition rates, and conducting more rigorous dietary studies on *C. alleganiensis* (through non-

destructive and minimally invasive sampling) in stocked versus un-stocked streams across NC.

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