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Note

# Into the drink: observation of a novel hunting technique employed by an Eastern Gray Squirrel (*Sciurus carolinensis*)

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## Abstract

Observations of typically herbivorous species have shown that animals will opportunistically eat animal tissue that is either scavenged or hunted. Squirrels from a number of genera have been observed to hunt prey and consume meat in terrestrial ecosystems. Here we provide evidence of a novel hunting strategy employed by an Eastern Gray Squirrel (*Sciurus carolinensis*), which has not previously been observed hunting aquatic prey. More rigorous observational studies are needed to determine the extent of this behaviour in Eastern Gray Squirrel populations and whether fishing is a common foraging behaviour for this species.

Key words: Eastern Gray Squirrel; fishing; foraging; hunting; predation; *Sciurus carolinensis*; swimming

A growing body of literature, including field studies and natural history notes, has confirmed that squirrels will consume vertebrate tissue, obtained through scavenging or predation (Middleton 1930; Callahan 1993; O'Donoghue 1994). Field observations and stomach content analyses have shown that squirrels will eat a wide variety of organisms, including small mammals, birds, reptiles, and amphibians (Middleton 1930; Callahan 1993). However, only a subset of these food items has been documented to be obtained through predation by a number of squirrel genera including *Sciurus*, *Tamiasciurus*, *Acthosciurus*, *Ammospermophilus*, and *Spermophilus* (summarized in Callahan 1993). Vertebrate tissue in Eastern Gray Squirrel (*Sciurus carolinensis*) diets is predominantly terrestrial in origin. However, such tissue makes up a small portion (<5%) of the overall diet (Nixon *et al.* 1968; Moller 1983). Here we document what we believe is the first observation of an Eastern Gray Squirrel hunting live fish from an aquatic environment.

At approximately 1800 on 27 September 2018, while canoeing the Speed River in Guelph, Ontario (43.543°N, 80.229°W), we encountered an Eastern Gray Squirrel perched on a large snag overhanging the water. Water levels adjacent to the snag appeared to be relatively low, and as we approached, the squirrel dove into the water. Entry into the water was head first, and its entire body went under the water's surface. This behaviour did not appear to be flight in response to our approach, because, after a few seconds, the squirrel swam back to the snag with a fish about 3–5 cm long in its mouth. It began to consume the fish before leaving the snag and retreating into denser foliage along the riverbank.

Our observation is remarkable for two reasons. No published observations of squirrels eating fish exist (although photos and unpublished anecdotes suggest that this behaviour may have been observed), and it is the first observation of a squirrel stalking, entering the water, and capturing a fish. Most observations of gray squirrels (both Eastern Gray Squirrel and Western Gray Squirrel [*Sciurus griseus*]) hunting have documented vertebrate prey as terrestrial birds and mammals (Bailey 1923; Middleton 1930; Holm 1976; Callahan 1993). Other tree and ground squirrels and chipmunks have been reported to feed on aquatic or amphibious organisms; however, in each case, the predatory event was terrestrial or the tissue was apparently acquired through scavenging (Howell 1938; Hesterberg 1940; Emmons 1980).

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In addition, there are few observations of Eastern Gray Squirrels swimming, except during mass emigration events (Schorger 1947; Larson 1962). Detailed reports by Schorger (1947) and Larson (1962) outline observations of Eastern Gray Squirrels swimming en masse and naturalists finding carcasses of drowned individuals along riverbanks and lakeshores. However, unlike other squirrel species, such as Red Squirrel (*Tamiasciurus hudsonicus*), which has been documented to swim over 2 km (Pauli 2005), Eastern Gray Squirrels are not widely reported to swim or spend significant time in the water.

The timing of our observation is also interesting as it appears not to conform to any of the three hypotheses proposed to explain predatory behaviour in squirrels (Callahan 1993). It is believed that vertebrate tissue, and in particular the nutrients obtained from it, can be an important source of energy for reproduction (Goodrum 1940; Keymer and Hime 1977). However, our observation falls outside the two peak reproductive periods for Eastern Gray Squirrel (Webley and Johnson 1983). Likewise, this observation was not an incidental kill related to either territorial defense or reproductive competition (Callahan 1993). Finally, it has been proposed that vertebrate tissue consumption by squirrels may increase seasonally to compensate for a seasonal decline in the quality of plant food (Callahan 1993). Although our observation did occur on 27 September, abundant plant resources still appeared to be available in the surrounding area. However, of the three hypotheses outlined by Callahan (1993), the latter is most likely to have influenced the fishing behaviour observed. In autumn, the diet of Eastern Gray Squirrels is composed primarily of nuts and seeds (Moller 1983); thus, it is possible that either local competition or depleted nut and seed resources may have led the observed individual to prey on alternative food sources. The fishing behaviour of the Eastern Gray Squirrel reported here might also be a learned trait unique to this population. Although the individual we observed and other members of this population likely only engage in this behaviour opportunistically, it demonstrates an unexpected behavioural flexibility in Eastern Gray Squirrel.

## Author Contributions

Writing – Original Draft: A.O.S.; Writing – Review & Editing: A.O.S., M.F., and K.B.; Conceptualization – A.O.S., M.F., and K.B.; Investigation – A.O.S., M.F., and K.B.

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