American Pygmy Shrew, *Sorex hoyi*, Consumed by an Arctic Grayling, *Thymallus arcticus*

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Arctic Grayling, *Thymallus arcticus*, are rarely reported to consume small mammals. We report an American Pygmy Shrew, *Sorex hoyi*, consumed by an Arctic Grayling caught in southern Yukon, Canada. This is the first record of an American Pygmy Shrew being consumed by an Arctic Grayling, and it confirms that Arctic Grayling will consume shrews (*Sorex* spp.) when they are available. We suspect that the body size of prey is a limiting factor in Arctic Grayling consuming small mammals, with some species of shrews being small enough for Arctic Grayling to consume.

Key Words: Arctic Grayling, *Thymallus arcticus*, diet, American Pygmy Shrew, *Sorex hoyi*, Yukon.

Several species of freshwater fish are known to consume small mammals. For example, Cochran and Cochran (1999) reported consumption of small mammals by a Brown Trout (*Salmo trutta*), and Northern Pike (*Esox lucius*) are well known as predators of small mammals (Lawler 1965). The occurrence of small mammals in the diet of Arctic Grayling (*Thymallus arcticus*), however, is rare. Prey items found in the stomachs of adult Arctic Grayling have largely been aquatic invertebrates, but terrestrial invertebrates, fish (including eggs), crustaceans, and molluscs have also been identified (Miller 1946; Stewart et al. 2007*). Moore and Kenagy (2004), however, found 2 Montane Shrews (also known as Dusky Shrews) (*Sorex monticolus*) and 3 Masked Shrews (*Sorex cinereus*) in the stomachs of 2 of 93 (2.2%) Arctic Grayling from Alaska, and de Bruyn and McCart (1974*) reported 7 unidentified shrews (*Sorex* spp.) eaten by 136 Arctic Grayling in northern Yukon. Moreover, in Russia, Teplov (1943) reported that the Common Shrew (*Sorex araneus*) was a significant prey item of the congeneric European Grayling (*Thymallus thymallus*). Juvenile collared lemmings (*Dicrostoynx* spp.) have also been found consumed by Arctic Grayling in the Northwest Territories (1 of 102 examined, 1.0%; Miller 1946). Here, we report an American Pygmy Shrew (*Sorex hoyi*) found eaten by an Arctic Grayling.

On 15 August 2010, we measured an average-sized, adult female Arctic Grayling (mass = 400 g; fork length = 342 mm) captured by an angler from Fish Lake (60.60°W, 135.24°W, 1109 m above sea level), in southern Yukon, Canada, and we collected the stomach. Examination of the stomach contents revealed a partially digested shrew and unidentified invertebrates, representing approximately 90% and 10% of the stomach contents, respectively. Using the keys of van Zyll de Jong (1983) and Nagorsen (1996), we readily identified the specimen as an American Pygmy Shrew (*Sorex hoyi*) based on dentition. This American Pygmy Shrew was the only small mammal found in the stomachs of 259 Arctic Grayling sampled in the Yukon during the period 1992 to 2010. Terrestrial invertebrates (i.e., bees, wasps, beetles, ants, spiders) were found in the stomachs of many Arctic Grayling sampled (Yukon Department of Environment, unpublished data).

Predators of American Pygmy Shrews are not well known. The main predators of American Pygmy Shrews are likely terrestrial carnivores, such as weasels (*Mustela* spp.), snakes, and owls (Long 1974; van Zyll de Jong 1983; Nagorsen 1996). This is the first record of an American Pygmy Shrew being consumed by an Arctic Grayling; we are not aware of any other documented records of fish consuming American Pygmy Shrews.

Typically, shrews are found near water (e.g., Wrigley et al. 1979; Doyle 1990), and they may occasionally enter the water, either intentionally or accidentally. Once in the water they are susceptible to predation by fish, or they may drown and later be scavenged. With regards to our observation, we do not know whether the Arctic Grayling killed and ate the American Pygmy Shrew or the Arctic Grayling found it already dead in the water and scavenged it. Arctic Grayling regularly consume terrestrial invertebrates that fall onto the water's surface, and they may also readily take small mammals in the water. However, we suspect that the body size of prey is a limiting factor in Arctic Grayling consumption of small mammals, with some species of shrews being small enough for Arctic Grayling to consume. Larger bodied small mammals (≥10 g), such as voles (*Myodes* and *Microtus*) and deermice (*Peromyscus*), are more abundant than shrews in the boreal forest (e.g., Krebs and Wingate 1976), but Arctic Grayling are likely limited by gape size from consuming them, except, perhaps, for juvenile small mammals.

Our observation is one of a few records of Arctic Grayling consuming shrews (*Sorex* spp.), and it confirms that Arctic Grayling will occasionally consume shrews when they are available in the water. Shrews are several orders of magnitude larger than the invertebrates that constitute the bulk of the diet of the Arctic Grayling, and they would represent a substantial

amount of energy for the effort expended to consume them. Thus, we expect Arctic Grayling would consume shrews as opportunity allows.

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