
A Novel Food Item (Diptera: Stratiomyidae) of Spotted Gar, *Lepisosteus oculatus* and Bowfin, *Amia calva*, from Southeastern Oklahoma

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Abstract: Predatory fishes such as Spotted Gar (*Lepisosteus oculatus*) and Bowfin (*Amia calva*) are top predators that feed primarily on fish. Both also occasionally take crustaceans, mollusks, and various aquatic insects. Here, we provide an instance where both species from a private lake in Oklahoma fed on an unusual novel food item, larval soldier flies, *Stratiomys* sp. (Stratiomyidae). It is unknown how or why these fish fed on this insect but suggests these predators may also occasionally feed opportunistically.

instance where both fishes were found to contain a large quantity of this novel food item.

Introduction

Gars (Lepisosteidae) and Bowfins (Amiidae) are top ambush predators that ingest a variety of prey items, the majority being fishes, including Gizzard Shad, Golden Shiner, bullheads, and sunfishes (Lee and Wiley 1980; Robison and Buchanan 1988; Etnier and Starnes 1993; Pflieger 1997; Miller and Robison 2004; Walker et al. 2013). Other food items reported from these fishes include: crustaceans, various aquatic insects, crayfish, mollusks, and frogs (Goodyear 1967; Dugas et al. 1976; Burgess and Gilbert 1980; Tyler and Granger 1984).

While obtaining fishes for parasitic examination, we discovered an unusual food item in the stomachs of a Spotted Gar, *Lepisosteus oculatus* Winchell and a Bowfin, *Amia calva* L. from the same collection site. To our knowledge, what we observed was a novel prey item that had not been previously reported from either fish species. Here, we document an

Methods

Fishes were taken by bowhunting at night on 28 October 2018 from a private lake on the Turner Ranch in the Little River drainage north of Idabel in McCurtain County, Oklahoma (33° 55' 56.93"N, 94° 43' 43.22"W). One specimen was a 670 mm total length (TL) female *L. oculatus* and the other a 470 mm TL female *A. calva*. Both were placed on ice and necropsied within 12 h. A midventral incision was made from anus to throat and the gastrointestinal tract, including the esophagus, stomach and intestines were cut, placed in separate dishes, and rinsed in 0.9% saline. The stomach of each was split lengthwise and food items examined and identified. Insect larvae were identified using the key in MacFadden (1967) and voucher specimens were deposited in the collection of the Louisiana State Arthropod Museum (Louisiana State University, Baton Rouge, LA). Photovouchers of fish were deposited in the Henderson State University Collection (HSU),

Arkadelphia, Arkansas.

Results and Discussion

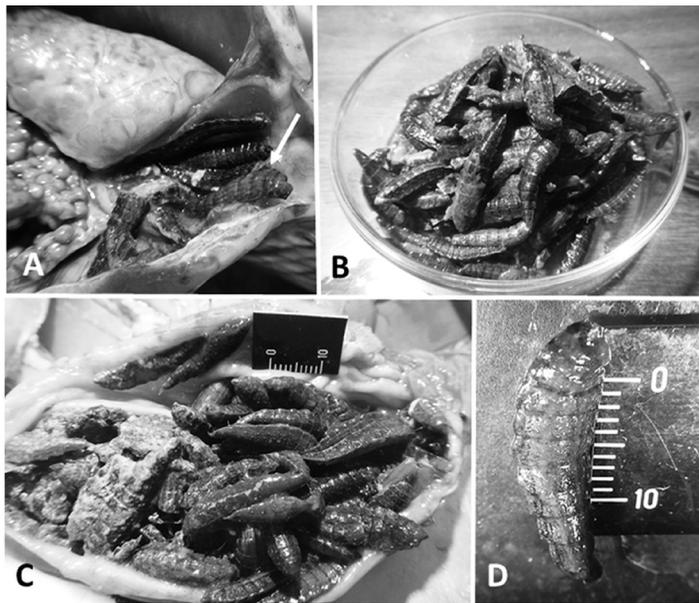
Both stomachs were found to be completely distended and contained the remains of >250 larval soldier flies, *Stratiomys* sp. (Figs. 1A–D) measuring 15 to 20 mm long. The identification was based on the presence of a caudal whorl of respiratory setae, location of the antennae on the ocular lobes, and various integumental characters. North American *Stratiomys* larvae are not identifiable to species using available resources, thus the designation “sp.”. The genus includes about 92 species with 30 species found in the Nearctic (James and Steyskal 1952; Woodley 2001). These larvae play a role as essential decomposers in breaking down organic substrates and returning nutrients to the soil and aquatic systems. Members of this genus are not only aquatic, but occur in the water column and are variously reported as filter feeders (Stehr 1987). Other larval members of the subfamily are detritivores in shoreline debris, so this finding, albeit unusual, is not completely unexpected. *Stratiomys* larvae may represent an

under reported forage base for predatory fish.

Although little detailed research has been done, all indications are that *Stratiomys* have annual life cycles in temperate regions. The related black soldier fly, *Hermetia illucens* (L.) has three generations a year in Georgia from April to November (Shepard et al. 2002). It is interesting to note that on several return visits to the same locality (April–June 2019), none of the other *L. oculatus* or *A. calva* that were necropsied were found to contain *Stratiomys* larvae in their stomachs. Based on scant evidence, we can speculate that (1) *Stratiomys* had a productive year at this locality, and (2) toward the end of the warm season, the larvae had reached maximum size during their annual growth cycle and would have attracted the attention of the larger predators.

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Figures 1A–D. Soldier fly larvae (*Stratiomys* sp.) from *Lepisosteus oculatus* and *Amia calva*. **A.** Stomach of *L. oculatus* showing larvae *in situ* (arrow). **B.** Standard-sized Petri dish with larvae collected from stomach of *L. oculatus*. **C.** Stomach of *A. calva* showing larvae *in situ*. **D.** Single larval *Stratiomys*. Note scale bars (mm) for Figs. C–D.

properties as well as assistance with collecting.

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