

First observation of an Eastern Musk Turtle, *Sternotherus odoratus* (Latreille in Sonnini & Latreille, 1802), inhabiting a crayfish burrow in South Carolina, USA

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Sternotherus odoratus (Latreille, 1802), the Eastern Musk Turtle or Stinkpot, is a small kinosternid turtle that is widely distributed across the eastern and central United States. It typically inhabits slow-moving or still waters such as ponds, lakes, swamps, sloughs, and backwater streams with abundant aquatic vegetation (Mahmoud, 1969; Rowe et al., 2009). Although *S. odoratus* is well known for its aquatic habits and use of refugia beneath logs or underwater root masses (Nickerson, 2000), its use of subterranean structures, such as crayfish burrows, has not previously been documented. Numerous other reptile and amphibian species, including the Crawfish Frog (*Lithobates areolatus*), Eastern Massasauga (*Sistrurus catenatus*), and Kirtland's Snake (*Clonophis kirtlandii*) are known to use crayfish burrows as refugia – presumably for overwintering and predator avoidance (Bavetz, 1994; Holycross and Mackessy, 2002; Heemeyer et al., 2012). Here we document the first known record of *S. odoratus* inhabiting a crayfish burrow. To the best of our knowledge, this marks the first known burrow association between a crayfish and a turtle species.

On 26 March 2024 we observed an adult *S. odoratus* (carapace length ca. 90 mm) occupying the entrance of an active crayfish burrow in a floodplain along the Little River beneath Old Calhoun Falls Road, Abbeville County, South Carolina, USA (34.1673°N, 82.49545°W, elevation 129 m). The turtle was seen in the burrow underneath the bridge on the right descending bank. The site consists of poorly drained soils dominated by soft rushes (*Juncus effusus*) and sedges (genus *Carex*) with standing shallow water. Burrows were attributed to the Piedmont Prairie Burrowing Crayfish (*Distocambarus*

crockeri; Fig. 1B), a burrowing crayfish that constructs deep, vertically oriented tunnels terminating in water-filled chambers connected to the water table (Eversole and Welch, 2013). The turtle was found lodged at the mouth of one such burrow with its head and forelimbs exposed. Upon gentle removal (Fig. 1A), excavation of the burrow revealed an adult female *D. crockeri* was within the burrow. A second nearby burrow contained a frog of the genus *Lithobates* resting in the entrance pool.

It is unclear whether *S. odoratus* was using the burrow as a temporary shelter, a thermal refuge, or a foraging site. Crayfish burrows provide stable microclimatic conditions and protection from desiccation and predation, which are benefits that could be advantageous to small aquatic turtles (Suter and Richardson, 1977; Noro and Backup, 2010). Musk turtles are known predators of crayfish (Ford and Moll, 2004), and the fact that there was a *D. crockeri* within the burrow raises the possibility that the turtle was exploiting the structure as both shelter and foraging opportunity. But given the small size of the observed turtle, active predation on an adult *D. crockeri* seems unlikely.

To the best of our knowledge, the use of a crayfish burrow by a turtle species has not been documented previously and provides an example of ecosystem engineering by burrowing crayfish (Reynolds et al., 2013). Crayfish in general, and burrowing crayfish in particular, are highly imperilled organisms that need conservation attention (Taylor et al., 2019; Bloomer et al., 2021). Given the important role of burrowing crayfish as ecosystem engineers, losses in crayfish biodiversity have the potential to impact both aquatic and terrestrial ecosystems, possibly having widespread negative impacts on native wildlife. Although the population of *D. crockeri* in this area appears relatively stable, several species of *Distocambarus* have disjunct distributions or possess limited ranges, underscoring the importance of continued monitoring and conservation of these specialized burrowing taxa.

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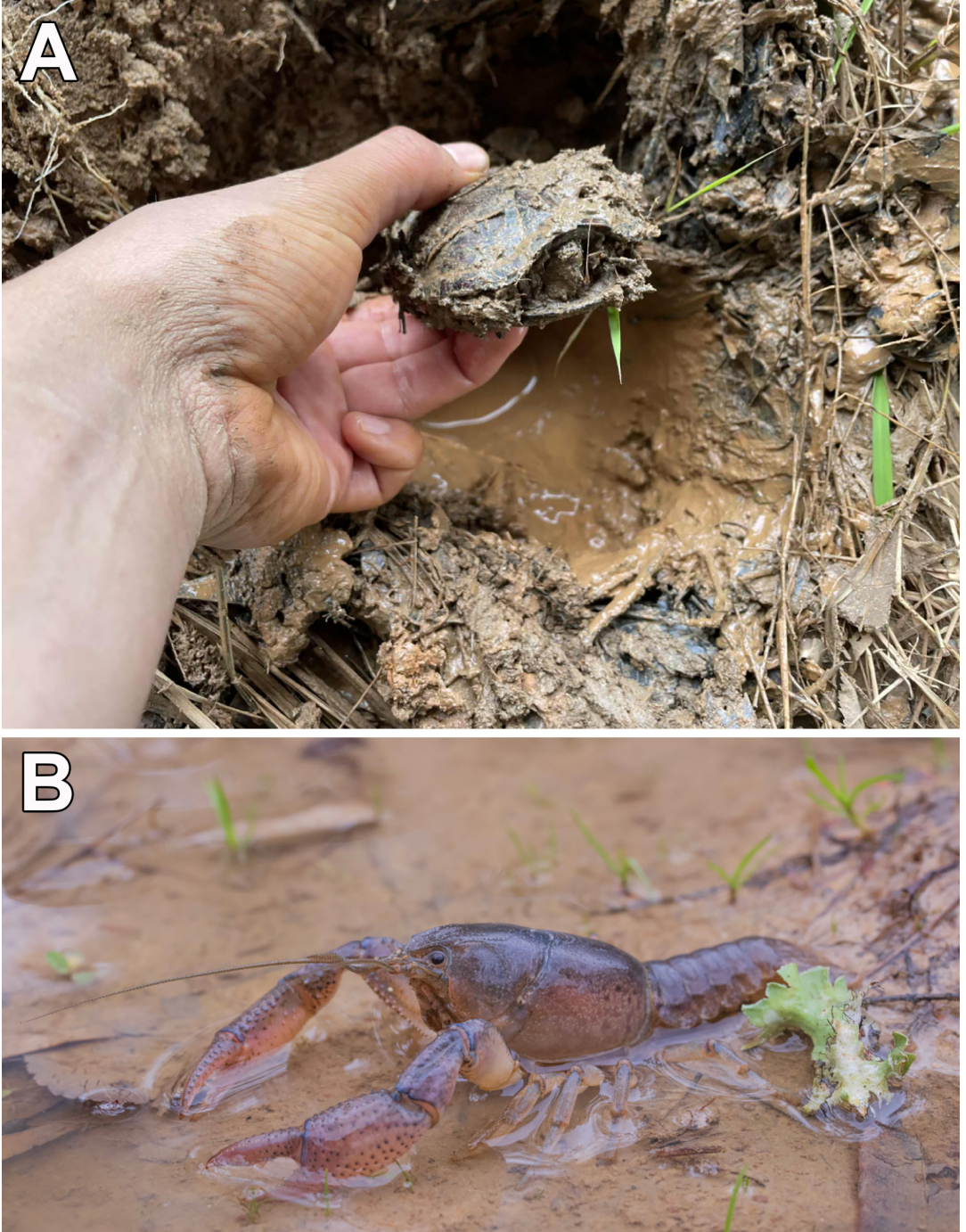


Figure 1. (A) *Sternotherus odoratus* after its removal from the entrance of an active *Distocambarus crockeri* burrow in Abbeville County, South Carolina, USA. The burrow contained an adult female *D. crockeri*. (B) An adult male *D. crockeri*. Photos by Eric Y. Ng (A) and Zackary A. Graham (B).

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