

# Note

## Spiny Softshell (*Apalone spinifera*) turtles exhibit scarring consistent with attempted lamprey bites

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### Abstract

We captured 46 Spiny Softshells (*Apalone spinifera*) during a mark–recapture study on Lake Erie (2012–2015). Six (13%) exhibited circular scars consistent with the bites of small parasitic lampreys. Two species of parasitic lampreys occur in Lake Erie: the invasive Sea Lamprey (*Petromyzon marinus*) and the native Silver Lamprey (*Ichthyostomyzon unicuspis*). The scars showed only the marks of the putative teeth surrounding the suctorial mouth, preventing identification based on the position of the supraoral teeth and suggesting that lampreys are rapidly dislodged from the turtles. To our knowledge, this is the first evidence of lampreys biting freshwater turtles.

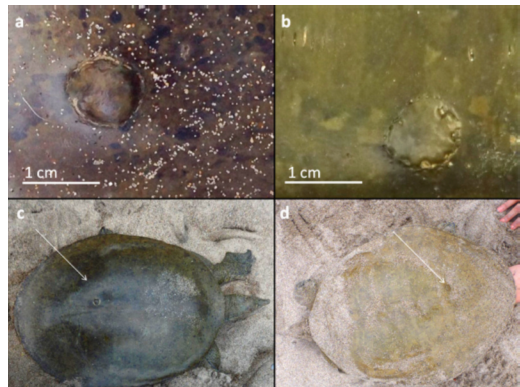
Key words: Spiny Softshell turtle; *Apalone spinifera*; *Ichthyostomyzon unicuspis*; parasitic lamprey; *Petromyzon marinus*; Sea Lamprey; Silver Lamprey; turtle; Lake Erie

Sea Lamprey (*Petromyzon marinus*) was inadvertently introduced into the Great Lakes in 1921, where it has had a devastating impact on the Great Lakes fisheries of Canada and the United States (Shetter 1949; Lawrie 1970). Sea Lamprey wounds are most commonly recorded on Lake Trout (*Salvelinus namaycush*; Shetter 1949; Lawrie 1970; Christie and Goddard 2003); however, a range of other teleosts also exhibit lamprey wounds (Shetter 1949). Sea Lampreys primarily feed on the blood and muscle tissue of the host species (Farmer 1980). Scars from these encounters are oval and occasionally show circular rings of tooth marks, which confirm that they were made by Sea Lampreys (Pike 1951). Parasite–prey dynamics and interactions between teleosts and lampreys in the Great Lakes have been well documented (Sullivan *et al.* 2003; Stapanian and Madenjian 2007), but little is known about other prey and feeding strategies.

From 2012 to 2015, we captured, marked, and released 46 Spiny Softshell (*Apalone spinifera*) turtles (45 females, one male; 64 captures in total) in and around Rondeau Provincial Park, on the north shore of Lake Erie, Chatham-Kent County, Ontario, Canada (42.286634°N, 81.896193°W). Spiny Softshells often exhibit a variety of marks on the carapace consistent with abrasion or infection, although we have not quantified the frequency of these during our surveys.

In 2014, we observed that five adult females and one male (13% of all individuals captured) exhibited different, distinctive scarring on their carapace that was potentially consistent with lamprey (Family Petromyzontidae) bites. Unlike typical small lesions from abra-

sions or infections, these scars consisted of a circle of regularly spaced punctures into the epidermis, approximately 1 cm in diameter, hypothetically consistent with the ring of teeth surrounding a lamprey’s suctorial mouth (Figure 1). The depressions formed by these punctures caused the undamaged skin in the centre of the ring to appear slightly raised (~5 mm) above the surface of the surrounding carapace. Lamprey-like scarring on Spiny Softshells was observed only on the carapace, and, in



**FIGURE 1.** Two examples of observed scarring, potentially consistent with lamprey bites, on the carapace of female Spiny Softshells (*Apalone spinifera*) captured at Rondeau Provincial Park, Chatham-Kent County, Ontario. Panels a and b show the characteristic ring of punctures surrounding unbroken epidermis, which differs from the lesions associated with infections or abrasions. Panels c and d show the locations of these marks (white arrows) on the carapaces of two turtles. Photos: A.K. Whitear (a, c) and Juliana Skuza (b, d).

all instances, the scarring was located in the central (bony) portion of the carapace. The scars appeared fully healed, and, in one scarred turtle that was originally captured in 2014 and then recaptured in 2015, the scar retained its appearance between captures. All scarred turtles were mature (mean female carapace length = 439 mm, range = 385–473 mm; male carapace length = 184 mm).

The introduced *P. marinus* shares Lake Erie with a native parasitic lamprey, Silver Lamprey (*Ichthyomyzon unicuspis*). The Great Lakes–St. Lawrence population of *I. unicuspis* was assessed as a species of Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2011). Bites of *P. marinus* and *I. unicuspis* may be distinguished based on the pattern of the supraorbital teeth (Pike 1951; Scott and Crossman 1998). However, the observed scars only contained marks consistent with the teeth surrounding the suctorial mouth. None included potential scarring from the supraoral teeth or rasping tongue. This is unsurprising, as softshell turtles have a strong bite. We suspect that any lamprey trying to attach to the carapace of a Spiny Softshell would be rapidly discouraged by the turtle's strong jaws, if it attached at a point that the turtle could reach. Alternatively, it may be difficult for lamprey to fasten securely onto the bony, smooth carapace of a Spiny Softshell.

To the best of our knowledge, this is the first reported evidence of lamprey attachment on freshwater turtles in Canada. It would be ideal to confirm our hypothesis with observations of lampreys attaching or attached to turtles, but this is unlikely in the wild. Still, we are unable to find a convincing competing hypothesis for the observed scarring. All Spiny Softshells with potential lamprey scars behaved normally, and the sites of the scars appeared to be fully healed. Any open wound can provide an avenue for infection, but turtles at our study site often sustain minor or even surprisingly severe injuries that do not impact their survival. If lampreys are indeed the cause of the observed marks, we consider it unlikely that this interaction would cause mortality or even have a significant sublethal impact on Spiny Softshells.

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