

Sunscreen and slime— Bonefishing is a

Messy Business



Bonefish rely on their eyesight more so than olfactory cues to find prey.

notion that bonefish show an aversion to flies that have been handled with sunscreen, yet many otherwise-serviceable flies have doubtlessly been retired as a result of this belief. On the flip side, anglers don't often consider how the chemicals in sunscreen might affect the health of a fish that has been handled with sunscreen-coated hands. Despite the fact that large doses of sunscreen have been documented to feminize male fish in other species, cause bleaching in corals, and trigger a plethora of other harmful effects to marine life. Today's angler has many alternatives to traditional sunscreens: UV-blocking gloves, shirts, buffs, hats, and more are all available to limit exposure to harmful UV rays while on the water. While such products are effective, very little information exists on how UV-blocking gloves might also affect a fish after handling. Researchers at the Cape Eleuthera Institute (CEI) set out to assess: 1) whether bonefish do show an aversion to sunscreen-contaminated baits, and 2) how do sunscreen products and UV-blocking gloves affect fish health following handling?

To first address the tale that fish are less likely to consume bait contaminated by sunscreen, bonefish were collected from nearby flats and held at CEI's wetlab for a series of observations on their feeding behaviors. Experimental trials consisted of supplying bonefish with shrimp handled with oxybenzone-containing sunscreen (conventional sunscreen), zinc-based sunscreen, or clean wet hands. Researchers observed how long it took a bonefish to bite and spit the bait, and measured the total weight of treated shrimp consumed. Results indicated that bonefish feeding behavior was unaffected by the addition of conventional and zinc sunscreens to the bait, and fish were neither attracted by nor dissuaded to consume contaminated bait. They didn't consume a different amount of shrimp when sunscreen was

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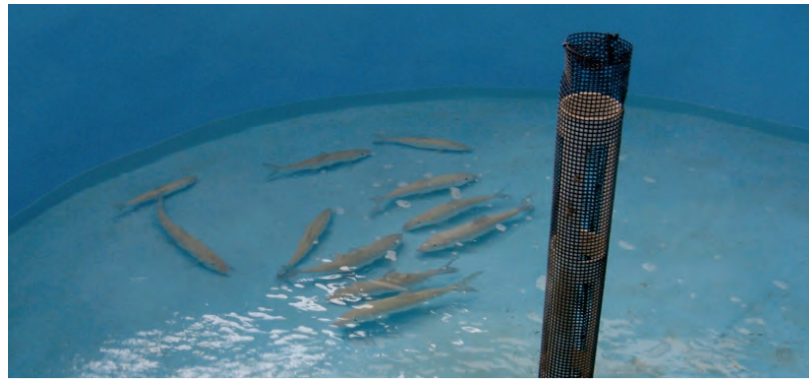
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Most bonefish anglers voluntarily implement catch-and-release practices, supporting a \$140 million industry in the Bahamas alone. The economic value of this fishery has prompted research on the effects of catch-and-release angling on bonefish, yet despite a growing understanding of angling-induced impacts on the physiology and post-release behavior of bonefish, gaps in our knowledge of best handling practices still exist.

Angler-perpetuated myths are as common as any good fish story, and some are staunchly believed. Take the idea that sunscreen, for example, is thought to add a scent or flavor to a fly that is unfavorable to bonefish, reducing the likelihood that a fish will eat it. Perhaps not surprisingly, no quantifiable evidence exists to support the




Angler handling a bonefish for a picture.
Replace with gloved hands if possible.



Bonefish acclimate quickly to a lab setting. Bonefish here are held before being separated into tanks for individual observation.

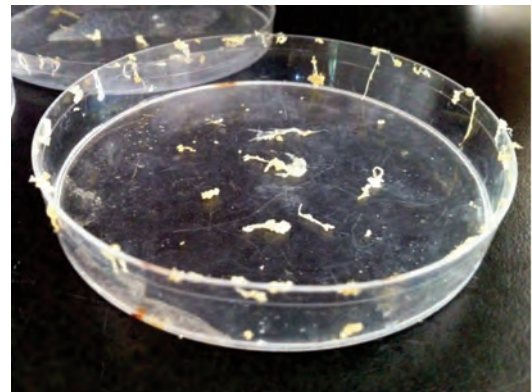
added and the time of their first bite did not change. Considering that bonefish rely primarily on their eyesight to identify prey, these results may not be surprising. Anglers should be more concerned with their choice of fly than what they last touched when it comes to hooking fish, but what about handling?

To examine the effects of handling a fish with contaminated hands, researchers simulated an angling event in the lab; fish were exercised via tail grabbing (a standard technique) around a large tank for 4 minutes, then handled and air exposed for 1 minute to simulate hook removal. Prior to handling, researchers coated their hands with either conventional oxybenzone-containing sunscreen, zinc-based sunscreen, donned UV-blocking gloves, or had clean wet hands. Mucous removed by the researcher's hands was weighed and recorded. Mucous, otherwise known as a fish's slime layer, is the first line of defense for a fish, and slime removal is known to increase the likelihood of infection in fish, which in extreme cases can result in post-release mortality. Results suggest that oxybenzone containing sunscreen removed significantly more mucous than zinc-based sunscreen, gloves, or wet hands, and wet hands resulted in the least amount of mucous lost across all treatments. Throughout the duration of the experiment, only two fish displayed evidence of bacterial infection following handling, and both fish were exposed to the zinc sunscreen treatment. Based on these results, anglers should consider avoiding handling of fish with sunscreen-coated hands, as well as with UV gloves. To best protect oneself from the sun with bonefish welfare in mind, rely on UV-blocking gloves, but remove them before handling a fish. Keep the bonefish in the water to avoid excess air exposure, and ensure your hands are wet to minimize mucous loss.

While sunscreen may not deter a fish from picking up your fly, this study demonstrates that anglers need to be cognizant of minimizing contact with a fish's slime layer. Even if a released fish looks healthy, mucous loss from handling can result in infection, behavioral changes, and a higher likelihood of post-release mortality. It is also important to consider the effect of sunscreen on the environment; nearly 6,000 tons of sunscreen is estimated to wash off swimmers annually, with negative impacts on corals, marine invertebrates, and other fish. Next time on the flats, minimize the risk to bonefish and their surrounding environment by limiting the use of sunscreens, and be sure to utilize best handling practices. 



A bacterial infection after handling the fish with hands coated in a zinc-based sunscreen.



Slime, or mucous, is a bonefish's first immunological line of defense, much like your own skin. Excess slime loss can leave a bonefish susceptible to bacterial infection and subsequent post-release mortality.

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