LSU professor develops technology to take mystery out of fishing

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Fishing, a supposedly relaxing pastime, all too often becomes a frustrating series of near misses and lost chances for the recreational sportsman. This frustration is magnified for those who make their living through fishing in professional tournaments; a near miss on the pro-fishing circuit can mean the difference between lucrative endorsement deals and a catastrophic six-figure loss. But what if there was a way to not only attract any fish in the area to your lure, but also to make them take the bait? That's where LSU's own John Caprio came in, developing then licensing scientific technology that takes the mystery out of reeling in the big one.

Caprio, a specialist in aquatic vertebrate taste and smell systems, studies the chemosensory systems of a number of common fresh and saltwater fish species. He has spent much of the last three decades researching and perfecting technology that is based on the natural impulses of a fish's sensory systems, using the fish's biology to increase the odds of making a catch. Caprio discovered the specific natural stimuli that activate taste sensors, resulting in nerve reflexes that cause the fish to ingest food or an appropriate fishing lure.

"If you look at how chemosensory input occurs in both our brain and that of a fish, you'll see that smell input is to forebrain whereas taste input is to the back, the highly reflexive part of the brain," said Caprio. "The take home message from this is simple: fish learn and associate particular scents as food, but taste is an actual reflex for them. The taste of particular natural chemicals triggers a feeding response." In other

words, if a fish is exposed to certain taste stimuli, it cannot control its urge to bite. Obviously, this has huge implications for the fishing industry, but the technology doesn't stop there.

LSU's Office of Intellectual Property worked closely with Caprio in the early stages of his technology's formation all the way through the licensing agreement with Mystic Tackleworks, a company dedicated to developing scientific fishing lure systems.

"This was an exciting advancement," said Associate Vice Chancellor for Intellectual Property, Commercialization & Development Pete Kelleher. "We evaluated Caprio's design, assisted with the patent process and negotiated the licensing agreement with Mystic Tackleworks." LSU still owns the intellectual property developed by Caprio, but licenses its use to Mystic Tackleworks, further proof that LSU researchers develop and contribute practical, applicable technology to communities outside of academia.

Mystic Tackleworks licensed Caprio's technology and brought in other fish sensory specialists in order to complete their new and ground-breaking Biopulse Lure System, which works by relying on decades of scientific studies on fish sensory systems.

"Because Mystic Tackleworks consulted me, along with Dr. Richard Fay, a leading expert in fish hearing, and Dr. Craig Hawryshyn, one of the world's top researchers in fish visual studies, we were able to look at this issue from a scientific position to develop a lure that would provide the appropriate natural stimuli to the various sensory systems (vision, hearing, taste, smell, mechanoreception) used by fish to locate prey and to also bite a lure," said Caprio.

While other companies have developed lures that appeal primarily to a single sensory system of a fish, BioPulse is the only one based on

providing the appropriate stimuli for each of the critical sensory systems used by the fish naturally in the capture of prey. And it all started at LSU, where Caprio designed the technology responsible for the system's unique approach to catching fish years ago.

At LSU, Caprio's primary research animals are channel catfish, which he refers to as "swimming tongues" because of their highly sensitive taste system. Catfish don't have scales like other fish, but skin that is covered with taste buds. Catfish are often in water with little to no visibility and therefore tend to rely more heavily on their sense of taste (and smell) over vision. Bass, however, use primarily visual cues to hunt, but do pay attention to a few known chemical cues. Once a prey item or lure is taken into its mouth, it undergoes an extraordinarily fast evaluation by the animal's taste system. If the item doesn't taste like food, bass can expel it rapidly, which is one reason why these fish are so difficult to catch. The BioPulse lures provide the appropriate natural stimuli that induce each of these and other species of fish to attack the lure.

Greg Mitchell, founder, chairman and chief science officer for Mystic Tackleworks, is excited about the science his company was able to utilize through Caprio's research and development.

"We are literally light years ahead of what's out there right now," explained Mitchell. "We won the ICAST Award in 2008, the world's top prize for fishing lures at the industry's largest competition, and this year we received the Pitney Bowes Award for the most promising new technology in the state of Connecticut [Mystic Tacklework's home base].We couldn't have done this without teaming up with the world's leading experts, like John [Caprio]."

Highlights of the BioPulse System lure include:

- Self-aware sensing system that monitors the lure's luminosity when it's in the water;
- advanced swim design features, which reproduce prey-like motion;
- scientifically developed acoustical output that emits sound frequencies appropriate to prey levels;
- utilization of visible and specialized UV light wavelength based stimuli -dependent upon depth in the water column;
- bite compression cavity that releases natural and pure feeding stimulant chemicals that make biting a "reflex" event;
- Sci-X Neuro-Stimulant Injection System;
- ambient light and parabolic surface reflectors;
- Sci-X scientifically engineered feeding stimulant pressurized injection canister;
- BioFlush anti-microbial cleaning solution squeeze bottle

More information: For more information about the BioPulse lure system, which is currently available for purchase, visit www.mystictackleworks.com/ or www.bio-pulse.com .

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