Collaboration Leads to Development of Aquaculture Net with Potential to Change the Way We Feed the World

LAS VEGAS — Feb 29, 2012 — A shark-resistant net, that can be a key to successful and sustainable open-ocean, warm-water fish farming, is being introduced today and is the result of a successful collaboration among NET Systems, Inc., DSM Dyneema and the Cape Eleuthera Institute.

It took over two years of research and development, and more than 20 different trials, to produce the PREDATOR-X shark-resistant net. A successful, easily handled shark barrier for commercial aquaculture can significantly increase the availability of food protein for millions of people, changing the way the world is fed, the companies involved said.

The PREDATOR-X netting, introduced here at the Aquaculture America 2012 conference, protects fish being raised in submerged open-sea aquaculture cages from attacks by sharks. Predator attacks have prevented the expansion of fish farming into temperate and tropical waters where a wide variety of fish can be grown.

The collaboration has involved NET Systems, Inc., manufacturer of the net, based in Bainbridge Island, Wash.; DSM, a global company active in health, nutrition and materials headquartered in Heerlen, the Netherlands; and the Cape Eleuthera Institute (CEI) based on the island of Eleuthera, in The Bahamas. CEI is a non-governmental organization that combines research and education to ensure the long-term health of local and global natural resources through sustainable approaches to their use, enjoyment and protection.

PREDATOR-X combines high-strength Dyneema® polyethylene fibers and stainless steel wire. The search for a predator-resistant net began in 2008 when a shark penetrated a net used on a commercial fish farm in the Pacific, and also when sharks penetrated the nets covering the CEI aquaculture cage in the Bahamas.

CEI contacted DSM seeking a solution. DSM Application Development and Technical Service Engineer, Ken Robertson based in the DSM Dyneema center in Stanley, N.C., joined forces with NET Systems' President Dan Oliver and Chief Engineer Koji Tamura to find a fiber-based net solution.

Material Solution Sought

"Nets are preferable to fences in open-ocean aquaculture. They are flexible, easy to handle, easy to fabricate on cages, and light enough to move about on boats," said Robertson. "The new PREDATOR-X netting provides the fish farmer with a product that can solve their predator problems and be much more effective and efficient than fencing

products." But to develop a net solution cost effectively, a combination of lab and field testing needed to be conducted.

The industry needed a flexible, light-weight material capable of enduring a "perfect storm" in the open seas and resisting the tearing and biting from apex predators like an 11-foot (220 cm) bull shark. PREDATOR-X has successfully withstood attacks from tiger sharks, hammerheads, black tip, reef, lemon and nurse sharks, as well as bull sharks.

The materials were field tested in the waters at CEI. Bait cages were developed for the field tests. For each new net material being tested, bait fish would be sewn into the cylindrical net, and the surrounding area spiced with chum and fish blood – all designed to draw sharks to attack the bait cage. Video cameras monitored the test sessions.

"Because of the time and expense involved in repeated field tests, we also needed a way to first evaluate various combinations of materials in the lab," said Robertson. "There was no such test, so we had to develop one," he added.

Margot Van-wunnik, an applications development engineer at DSM Dyneema in Urmond, Netherlands, developed a bite simulation test. The procedure was developed after consulting shark experts at the University of South Florida, using real shark teeth as the original base for initial lab simulations.

The PREDATOR-X net has been installed on CEI's aquaculture cage in the Bahamas, where a full-scale grow out of cobia stock is underway. The fish will be harvested this coming November.

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