

NATURE WRITING

From the Sag Harbor Express February 4, 2010

When you See a Horseshoe Crab

Be Sure to Say “Thanks”

Anthropologists say horseshoe crabs were on earth (or in the water) before the dinosaurs, over 500-million years ago. It's an unusual animal with a big, round carapace on its leading end and a harmless, spear-like tail, called a telson, bringing up the rear. Ethicists would claim we should protect them because we should care for any organism that shares our planet. They're right of course, but there are more pragmatic reasons to respect the homely creatures.

Horseshoe crab blood, literally blue in color, contains a unique component called LAL for Lumulus Amoebocyte Lysate that reacts when exposed to bacteria. The U.S. Food and Drug Administration recognized this as a valuable tool and now requires drugs, intravenous tubing, and critical medical equipment to be screened with LAL to make sure they are free of bacterial contamination and safe for humans, meaning you and me. Science hasn't been able to reproduce this compound synthetically so it's no wonder the blood is said to be worth \$15,000 a quart. Biomedical companies that process LAL capture live horseshoe crabs and carefully draw small amounts of blood before returning them to nature. As with human donors, the blood reconstitutes in the released crabs within a few months.

Beyond use of its blood, the horseshoe crab is the single most studied invertebrate in the world, vital for research in a flock of sciences -- ecology, microbiology, biotechnology, pharmacology, immunology and neurophysiology. Three Nobel Prizes have been awarded to scientists who investigated the crab's physiology to gain insight into human health. Most of what medical researchers know of vision came from 50 years of work with the crab's large, compound eyes that peek out from bumps on its dome-like shell. The eyes have a relatively simple construction and a readily accessible optic nerve. Forty years ago, Dr. H. Keffer Hartline received a Nobel Prize for research that led to the cure of an ailment that can cause blindness. Today, the State University of New York uses the crab to continue eye research. The University of Florida is researching its ability to see as well or better in dark than in daylight. Besides eye research, scores of other university projects are underway on subjects as diverse as immune systems, molecular defense mechanisms, and the effects of LAL on AIDS and HIV.

Everyone on the eastern seaboard probably has seen horseshoe crabs, but the largest population in the world is in Delaware Bay. A female crab will come onshore three or four times in May and June during full and new moon tides. She might lay 4000 eggs at a time in the wet sand. Males that have hitched rides on the larger females crawl over the nest and fertilize the eggs. New crabs mature at ten years, molting as they grow, and may live as long as twenty years. With five pairs of legs and gills, they are considered arthropods, related more to spiders than crustaceans.

As if their contributions to human kind were not enough, horseshoe crabs also sustain millions of migrating birds -- sanderlings, ruddy turnstones and especially red knots that make a 10,000-mile journey every year from the tip of Argentina to the Arctic

Circle. Along the way, they stop for several days on coastal beaches and replace lost body weight by gorging on surplus crab eggs that have risen to the surface of the sand.

My wife and I walk every day along a bay beach on Long Island, New York, and when we first moved here we always saw horseshoe crabs in the shallows, especially during spring spawning season. Now we rarely see them. About ten years ago, returning from a sail to Chesapeake Bay, I overnighted in Cape May. As I relaxed on deck I watched a big open boat with two men in the stern enter the harbor. When the boat motored near us and I took a closer look at its cargo, I was startled. Hundreds upon hundreds of horseshoe crabs were stacked up to its rails, piled on one another like coal in a truck. I wondered why anyone would collect such a mass of these strange creatures.

I didn't tie the incidents together until I read a newspaper item reporting that the State of Delaware was setting stricter limits on harvesting of horseshoe crabs. The article explained that huge numbers are taken by fishermen who chop them up to make attractive bait for eel and whelk pots. I haven't seen eels and whelks (also called conchs) on restaurant menus but apparently there are lucrative markets for them in the Far East.

Bioscience Magazine reported that the harvest of crabs grew from approximately 100,000 in 1992 to two-million in 1997. Tellingly, the red knot population declined more than 60 percent in the last twenty years, but appears to have stabilized. The crab population in Delaware Bay apparently is growing thanks to tougher regulations.

Restrictions in Delaware and New Jersey raised fears of greater pressure in other coastal regions. But a number of major efforts are underway to safeguard horseshoe crab populations. Just in the Northeast, the Connecticut Dept. of Environmental Conservation has banned harvesting in three areas along Long Island Sound. Late in 2008, the Fire

Island National Seashore prohibited any harvest. Sacred Heart University is studying the crab population along the coasts of four states. The NY State DEC has been working with Cornell Cooperative Extension to monitor horseshoe crab populations on Long Island and Peconic beaches. The Atlantic States Marine Fisheries Commission (www.asmfc.org) will assess data from the entire East Coast and set allowable catches for each state.

A horseshoe crab may look homely, even scary, but we should spread the word that it's an extremely valuable member of our beleaguered world. A website sells T-shirts that say, "I (heart) horseshoe crabs." If people joke about it, you'll have a good excuse to tell them all about this remarkable creature.

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