

# Bleeding, bait and birdfood: Challenges for the world's horseshoe crabs

Horseshoe crabs reside in shallow bays and estuaries, but come ashore on sandy beaches or in mangroves to spawn along the high tide mark every spring. In places where they are abundant, such as in Delaware Bay in the USA, their eggs are a vital source of food for Red Knots and other migratory shorebirds. These crabs first appeared 475 million years ago in the Ordovician period and are now represented by four species. Three of these, *Tachypleus tridentatus*, *T. gigas*, and *Carcinoscorpius rotundicauda* are distributed in Southeast Asia, while the fourth, *Limulus polyphemus*, occurs along the Atlantic coast of North America.

The blood of horseshoe crabs yields an important diagnostic reagent, Limulus Amoebocyte Lysate (LAL) that is a sensitive indicator of bacterial contamination, and when mixed with even trace amounts of bacteria, LAL will clot almost instantaneously. In addition to capture for bleeding in the LAL industry, horseshoe crabs in the USA are also harvested for use as bait in the eel and whelk fisheries. These fisheries are well managed by the Atlantic States Marine Fisheries Commission, which has established catch quotas and bleeding protocols to ensure sustainable use of the species. The annual value of the horseshoe crab for bleeding in North America is upwards of USD 100 million, for bait USD 2 to 5 million and for tourism and birding around USD 10 million. In Southeast Asia, horseshoe crab populations are threatened by coastal development, unregulated bleeding programmes, human consumption and pollution.

With a growing consensus among scientists that Southeast Asian horseshoe crab populations are dramatically declining, and with increasing awareness about the threats from overharvesting and habitat degradation, the International Symposium on the Science and Conservation of Horseshoe Crabs was held in 2007 (1), followed by the International Workshop on the Science and Conservation of Asian Horseshoe Crabs in 2011 (2). The Asian species of horseshoe crabs are currently listed on the IUCN Red List as Data Deficient, but given the overwhelmingly pessimistic reports, it seemed imperative to establish a Horseshoe Crab SSG to review the available data and update these assessments, as a first step towards developing comprehensive conservation strategies for all four species.

Since the inception of the SSG in 2012, a new and unexpected threat to American horse-

shoe crabs has arisen. The supply of *Limulus* appears to be insufficient to meet the US bait industry's needs, and to fill that gap, some bait dealers have started to import horseshoe crabs from Asia. Under current laws, neither the export of horseshoe crabs from Asia nor their importation into the USA is illegal. Why might this practice be damaging? Although the crabs are cut into pieces before placing them into baited traps, Asian horseshoe crabs harbour encrusting invertebrates such as molluscs, barnacles, and bryozoans which have the potential to become harmful invasive species. Moreover, imported parasites and diseases have the potential to infect the native *Limulus* population, with potentially catastrophic ecological repercussions to Red Knots and other migratory shorebirds. From a different but equally important viewpoint, allowing the importation of Asian horseshoe crabs into the USA provides an economic incentive for fishermen in Southeast Asia to further deplete their own horseshoe crab populations.

IUCN guidelines for preparing risk assessments for the introduction of non-native animals and diseases emphasize the need to identify and prioritize hazards early in the process. However, the importing of Asian horseshoe crabs into the USA has already started, without even a cursory risk analysis. Our SSG has alerted State and Federal agencies of the potential risks associated with the importation of Asian horseshoe crabs into the USA and we have recommended that this practice be stopped until a full and detailed risk analysis is completed and any risks that are identified are either mitigated or removed.

In Southeast Asia the challenges are stiffer. The crabs are listed for second tier protection in China. This means there should be no public sale, but enforcement is a problem. For the Specialist Group the priority is updating the Red List status in order to provide a basis for some controls over harvesting. Preservation of essential spawning habitats is also critical.

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Photos: Below - *Carcinoscorpius rotundicauda* on stream bed. Credit: Kevin Laurie. Top right of page - *Limulus polyphemus* mating cluster. Credit: Mark Botton.