



2023 INTERNATIONAL HORSESHOE CRAB DAY

Against All Odds: Stories of Coexistence with Horseshoe Crabs



Sharing stories of living with horseshoe crabs in an ever-changing world

INTRODUCTION

In June 2019, during the IUCN SSC Horseshoe Crab Specialist Group international workshop in Guangxi, China, participants from 14 countries and regions endorsed the Beibu Gulf Declaration on Global Horseshoe Crab Conservation, to call for strengthening of policy making and better enforcement, more scientific investigations and research, sustainable management of horseshoe crabs, restoring natural populations and protecting their critical habitats, and promoting public and multi-party participation in horseshoe crab conservation.

In further extending their public outreach activities around the world, the IUCN SSC Horseshoe Crab Specialist Group have designated 20th June every year as the International Horseshoe Crab Day to showcase the collective conservation efforts for the four horseshoe crab species.

Since the first International Horseshoe Crab Day in 2020, more than 60 conservation educational activities, including symposia, webinars, public talks, film and video shows, exhibitions, workshops and eco-tours were organized across the geographical range of horseshoe crabs. Information on such activities will be posted on a webpage of the Beibu Gulf University, China (<https://lbgmbc.bbgu.edu.cn/gjhbyr.htm>).

Editors:

Elizabeth Hieb, Dr. Kit Yue “Billy” Kwan, Dr. Yumiko Iwasaki (Japan Coordinator)

Ecological Research and Development Group (ERDG)

United States



Greetings, everyone! Today, we're celebrating a truly special occasion - International Horseshoe Crab Day! Here at the Ecological Research & Development Group (ERDG), we honor these ancient mariners not just today, but every day. Their story is one of endurance and survival, making them the perfect embodiment of this year's theme: "Against All Odds."

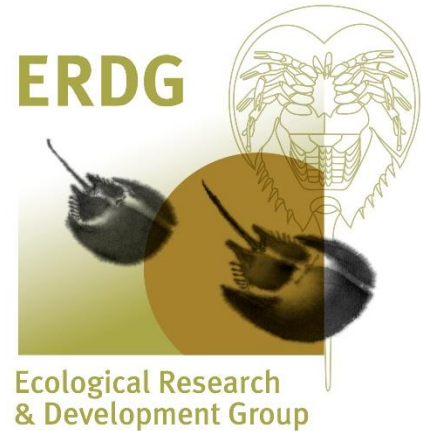
Three of our most inspiring programs capture the essence of what it means to live, learn, and grow with these extraordinary creatures:

Just flip 'em![™] is a program born from a simple act of kindness: helping horseshoe crabs who've become stranded during their yearly spawning ritual. Sometimes, compassion can be as simple as flipping over a stranded horseshoe crab. Remember, always flip them over by the edge of their shell, not their tail, to protect them from harm. This small act can make a world of difference to the survival of a species that has graced our planet for over 450 million years.

Backyard Stewardship[™] takes that spirit of compassion to the community level, by empowering local communities to preserve the spawning habitats of these incredible mariners. To date, more than 16 miles of crucial horseshoe crab spawning habitat has been protected, teaching us that conservation begins right in our own backyards!

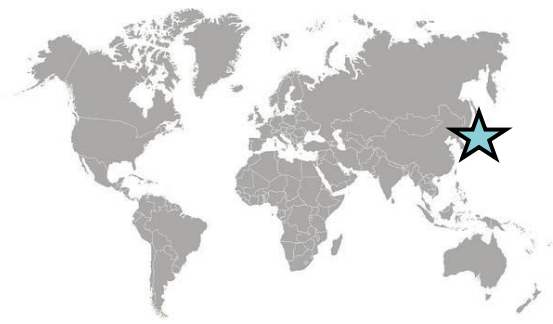
Young Voices[™] provides a creative outlet for our budding environmental stewards to celebrate horseshoe crabs through the arts. From poetry to painting, we're giving the next generation of environmental stewards a global platform to express their admiration and concern for these extraordinary creatures. Every year, through art, students worldwide amplifying their voices in a global chorus of admiration for these remarkable creatures.

So, today and every day, let's appreciate the horseshoe crab, educate others about their fascinating story, and continue living harmoniously with them. Because here at ERDG, International Horseshoe Crab Day isn't just a day; it's a lifestyle. So, come join us and let's celebrate, not just "Against All Odds," but for all possibilities!



Mud Scientist

Japan



Dear horseshoe crab lovers,

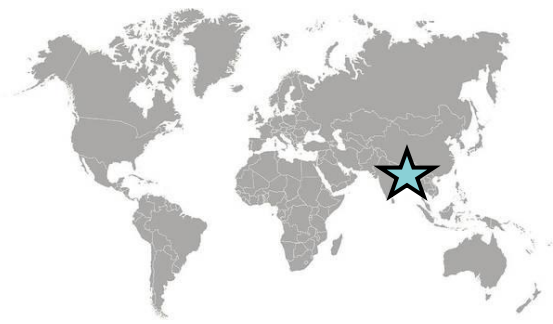
I have been crazy about tri-spined horseshoe crab since I first met a pair of mature adults in the field in 2017. We have been studying the abundance of juveniles in the nearby mud flat called “Hachi-no-higata” in Hiroshima Prefecture, Japan since then. We are also making efforts to exactly inform the next generations and ordinary people of this precious living fossil. However, we have been struggling against two things.

First, some cannot endure such a segmented, huge arthropod. Last year, we took students and their teachers of a primary school to a mud flat to observe juveniles of tri-spined horseshoe crab. Soon after we arrived there, we found some, relatively large juveniles. I carefully put them on their hands. One female teacher suddenly screamed and said in front of them, “What a creepy animal it is!” We were highly disappointed at her attitude and thought that our education was totally spoiled by her. How do you think of it? Could you please inform us of any good idea to avoid such an accident?

Second, under the modern capitalism, we cannot easily fight against mad politicians and entrepreneurs who neglect nature and are interested only in money. In our city, a LNG power plant was nearly built next to the mud flat where tri-spined horseshoe crab barely inhabits. This plan was pushed by such a combination. How do you think of it? A strict international law is absolutely needed to conserve not only horseshoe crab but also other endangered organisms. If they look like panda, koala and dolphin, people tend to positively conserve them. How about horseshoe crab? This is related to the above-mentioned trouble.

Wah Wah Min

Myanmar



I found horseshoe crabs in Pak Nakhon mangrove areas in Tha Sala, Nakhon Si Thammarat, Thailand in 2022. Actually, I am working on biodiversity of crabs and molluscs project in this area so I collected all horseshoe crabs in mangrove areas. Every Friday market in Tha Sala I recognized that at least one or two horseshoe crabs' sellers are selling as a food for salad so I am so worried and I am watching every week. I saw some restaurants are selling horseshoe crab alive to prepare food for visitors when I visited to Phuket in April, 22-24. I got information from local people that horseshoe crabs' populations are declining because of catching only female horseshoe crabs for eating their eggs. Now I am

starting horseshoe crabs' data collection in Tha Sala mangrove forest, Nakhon Si Thammarat, Thailand for my research project without funding. There was no up to date data of horseshoe crabs in Nakhon Si Thammarat.

Jaymee (邓剑媚)

Zhanjiang, Guangdong, China



I live on an island. In July 2020, I organized a beach cleanup event for ocean garbage. A volunteer named Zhuang Lifeng came to our fishing village to participate in the event. She diligently searched the fishermen's garbage cans on the beach and rescued a Tri-spine horseshoe crab from one of them. She shared with me that the fishermen in this village often catch Tri-spine horseshoe crabs while fishing for crabs. These horseshoe crabs face survival difficulties on the beach because the fishermen lack awareness of protecting them and often discard them after accidentally catching them. If they are exposed to the sun for a long time, they can easily dehydrate and die. She made me aware of the survival difficulties faced by horseshoe crabs in the fishing village where I live. Her firm and pure gaze also influenced me. Since then, I have been encouraging and leading the children in our village to rescue horseshoe crabs on this beach and return them to the sea if they are at risk of dying from sun exposure. At the same time, we organized related horseshoe crab science classes to let the children in the village learn more about horseshoe crabs and collect stories from local fishermen about their interactions with horseshoe crabs. We increasingly feel that horseshoe crabs are friends, not just small animals. The children's actions to rescue horseshoe crabs also influenced fishermen and tourists, who would also join in rescuing horseshoe crabs with the children. From 2022 to 2023, we recorded a total of 57 rescues by community children, parents and tourists, saving 529 horseshoe crabs. We hope that more people will join us in protecting horseshoe crabs in the future.

我生活在一个海岛上。2020年7月，我组织了一场海洋垃圾环保净滩活动，有一位志愿者（她叫庄礼凤）来到我们的渔村参加活动，她在海滩上认真地翻找渔民的垃圾桶，并在垃圾桶中解救了一只中国鲎。她跟我分享“这个村的渔民捕捞螃蟹时易兼捕中国鲎上岸，目前这些被兼捕的鲎在海滩上存在一定的生存困境，渔民缺乏保护鲎的意识，误捕后随意将其丢弃，鲎若离海长期暴晒，容易脱水死亡。”她让我知道了原来我生活的渔村社区里的鲎面临着生存困境，她坚定又纯粹的眼神也影响了我，从那以后，我就开始鼓励和带领我们村庄的孩子们一起在这片海滩救鲎，将可能被日晒而亡的鲎送回海里。同时，我们组织相关的鲎科普课堂，让村里的孩子们了解更多鲎的知识，并且收集村里的渔民们他与鲎的故事。我们越来越觉得鲎是一位朋友，而不只是一只小动物。孩子们救鲎的行动也影响了渔民和游客，大家也会和孩子们一起救鲎，2022年-2023年我们记录到社区儿童、家长和游客等共救鲎57次，529只。希望未来有更多人一起守护鲎。



Lingping Zhang (张丽萍)

Marine Science Class 223 (海洋本 223), China



The first time I learned about horseshoe crabs was on September 13, 2022. Our college organized a visit to the laboratory, and it was a senior student who introduced those "ugly-looking" little creatures to us in the horseshoe crab breeding lab. Since the hatchlings were not easy to introduce, the senior student picked up a huge horseshoe crab and placed it in the palm of her hand. I could see it more clearly then, with some legs that could flip and cover things. I found it quite intimidating, and at least my initial reaction was not very fond of it. Later, we went to the specimen museum, where the tour guide provided explanations, and I gained a better understanding of this "ancient" creature. I felt that this creature was quite fascinating, especially when I learned that its blood is blue. Interestingly, during an internship at the seaside in San Niang Wan, I came across several stranded and deceased adult horseshoe crabs, as well as some discarded shells that were larger than my palm. I took photos and sent them to a senior in the horseshoe crab research team. Although we couldn't determine the cause of death, it made me realize that horseshoe crabs were no longer just "creatures," but living beings, magical friends right beside us. Later, I learned online that horseshoe crab blood is an important component of the COVID-19 vaccine. In fact, almost every vaccine contains horseshoe crab blood, but we were unaware of this creature before.

Now, I find horseshoe crabs truly amazing, adorable, and precious. I believe there are still many mysteries about them yet to be discovered by humans. We should treat them like friends and protect them.



第一次知道鲎是在 2022 年 9 月 13 日那天，学院组织我们去参观实验室，当时是一位学姐在培育鲎的实验室里向我们介绍了那些看起来“很丑”的小玩意儿，因为幼崽不好介绍，学姐拿起一个庞大的鲎放在手掌心上，我看得更清楚了，有几只足还会翻盖的东西，我觉得挺可怕的，至少我当时第一反应是不太喜欢。后面进到标本馆参观，经过讲解员的介绍，我更加了解了这一“古老”生物，感觉这玩意儿蛮神奇的，血液居然是蓝色的。说来也巧，后来外出见习，在三娘湾的海边，我发现了好几只搁浅并且已经死亡的成年鲎，还有一些褪去的壳，比我的手掌还大，我拍照下来发给一位鲎团队的师兄，虽然死亡原因我们都无法得知，但这更让我觉得鲎不再是一个“玩意儿”，而是活生生的，就在我们身边的一群神奇的朋友。再到后来，在网上得知鲎血液居然是这次新冠疫苗的重要成分，其实几乎每种疫苗里都有鲎血液存在，只是以前我们并不知道有鲎这种生物。

现在，我只觉得鲎太神奇，太可爱，也太珍贵了，我觉得在他们的身上还有着很多奥秘之处没有被人类发现，我们要像对待朋友一样对待他们、保护他们。

Penghui Huo (霍朋辉)

Jimei University, China (集美大学)



The ancient creature with blue blood left the deepest impression on me when I first encountered horseshoe crabs. Many years later, today, I had another encounter with horseshoe crabs during my internship at the factory. This was my true introduction to horseshoe crabs, getting to know them, seeing them crawl on the beach, swim in the water, and witnessing their unique behavior of smaller males riding on the backs of larger females, resembling a husband being carried by his wife, earning them the nickname "underwater mandarin duck". The intriguing behavior of horseshoe crabs and their distinctive appearance captivated me, prompting me to delve deeper into understanding them. Previously, due to overfishing and environmental pollution, the population of horseshoe crabs had significantly declined. However, in recent years, with the vigorous promotion of ecological environmental management in my country and efforts in artificial breeding and release, the conservation of horseshoe crabs in their natural habitat has greatly improved. The changes in the environment for horseshoe crabs reflect changes in the marine ecosystem. Protecting the environment, respecting nature, and fostering a harmonious coexistence between humans and nature are essential.



古老的生物，蓝色的血液，这是我初识鲎留下的最深印象。在多年后的今天，在实习的工厂里再一次与鲎邂逅。这是我真正意义上的第一次认识鲎，了解鲎，看见鲎在沙滩上爬行，在水中游动，看见鲎一般两只一起行动，较小的雄性趴在较大的雌性身上，看着好像媳妇背着丈夫，因此也有“海底鸳鸯”的美称。鲎的这种有趣的行为以及它独特的造型，吸引了我，让我更深入的了解鲎。之前由于过度捕捞以及环境污染等问题，导致鲎的数量大大减少，但近年来，我国生态环境治理的大力推进以及鲎的人工增殖放流，鲎在自然中的生存得到了很好的保护，鲎的生存环境的变化，就是海洋生态环境的变化，保护环境，敬天爱海，人与自然和谐共生。



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Robert Loveland

United States

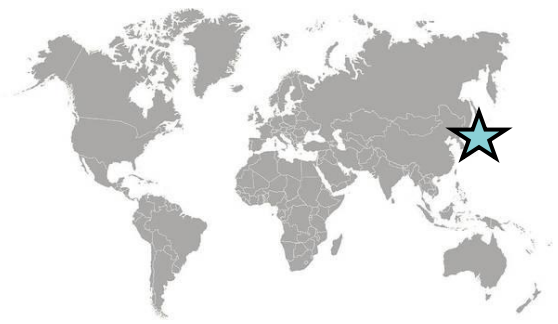


I was about 14 years old on my first trip to the habitat of horseshoe crabs in Delaware Bay. My father took me fishing out of Fortescue, a small Delaware Bay coastal town along Fortescue Creek where we often rented a small boat. On that day, he dropped me off so I could go fishing at the mouth of the creek, where the creek entered the bay. While he was busy at the local bar, I fished along a sandy beach near the creek. The tide was rising. Suddenly, I began to notice these strange monsters emerging from the bay water, and moving toward me, standing in the water in my sneakers with a fishing pole in my hands. “Oh no!” I mumbled. “Let’s get out of here before they attack.” I described these creatures to a local guy who was watching too. He said: “Oh ye. Dem are Kingcrabs. They come out of the bay about this time every Spring.” I gathered my fishing gear and went up the creek where there were no Kingcrabs. In the summer after my first year at Rutgers, I took a job as a lab assistant at the Cape Shore Research Lab. I was to sample the water quality every high tide. On my very first sampling day, I noticed the Kingcrab monsters coming ashore. I ain’t wading out there in my sneakers. I’ll climb out on the jetty and sample the water. But, I fell off the jetty and made my way back to shore, outrunning the Kingcrabs. Then I put on a pair of wading hightop boots, and back out to sample the water I went. The heck with Kingcrabs; they will ignore me. But no. The crabs made a beeline toward me, and tried to attach to my boots. The boots, mind you, were exactly the color of the Kingcrabs. They thought that I was simply another large Kingcrab. I got the heck out of there. To retain my job, I eventually learned to wade among the “Horseshoe Crab” mated pairs. They ignored me, so I went about sampling the water. A few years later, Mark Botton came down to the lab to do research on *Limulus polyphemus*.



Shinji Itaya

Japan



In 2003, I started field surveys of *T. tridentatus* in Tsuyazaki, Fukuoka, Japan, with Dr Toshifumi Wada. Dr Wada, a dedicated ecologist and conservationist, passed away in November 2018. Through the horseshoe crab network, I've had the privilege of connecting with people from Japan and around the world. The potential extinction of horseshoe crabs, who have thrived for over 200 million years, raises important questions about balancing conservation and development in modern society. I am committed to continuing Dr Wada's legacy and collaborating with global partners to protect horseshoe crabs.



Tao Bian

Guangxi BRC Association, China



On May 22nd, during our investigation of the intertidal zone at Xia Cun Beach, a villager approached us and said they had come across an injured horseshoe crab. It was the same crab depicted in the picture with two openings on its carapace, revealing its walking legs. Jiu Ge, one of the villagers accompanying us, carefully examined its wounds and confirmed that it was the same crab he had discovered and rescued on the 16th. Over the course of seven days, this resilient horseshoe crab, aptly named "Strong Horseshoe Crab," not only survived but also crawled nearly two kilometers across the intertidal zone.

On May 16th, Jiu Ge encountered this injured horseshoe crab in the intertidal zone of Xia Cun. Judging by the shape of the wounds, it was accidentally injured by the rake of a shellfish digger. Jiu Ge placed it in an area near the mangroves where few people ventured, but he didn't hold much hope for its recovery. Unexpectedly, after a week had passed, it was still persistently living in the intertidal zone of Beihai, catching the attention of Xia Cun villagers once again, who sought our assistance. Former villagers who used to consume horseshoe crabs, witnessing the rapid decline in their numbers, had started actively rescuing injured horseshoe crabs in the intertidal zone. They also collaborated with environmental organizations to promote eco-friendly beach activities, reminding visitors not to harm or collect horseshoe crabs. They have become a strong force in protecting horseshoe crabs.

May this resilient "Strong Horseshoe Crab" continue to endure until its next molt, and may it perpetuate its miraculous life in the ocean!



5月22日，下村滩涂调查途中，一位村民找上我们，说是在滩涂上遇到一只受伤的鲎，就是图片里这只背甲上有两个破口，露出了下面的步足的“鲎坚强”，和我们同行的村民九哥，仔细比对了它的伤口之后，确认是他在16日发现、救助的同一只，七天的时间里，“鲎坚强”它不仅坚强地活着，还在滩涂上爬行了接近两公里的路程。

5月16日他在下村的滩涂上遇到了这只受伤的鲎，从伤口的形状看是被挖螺的耙子不小心挖到，九哥将它放置在了红树林边人迹罕至的地带，但对它的恢复没有报太多希望；未成

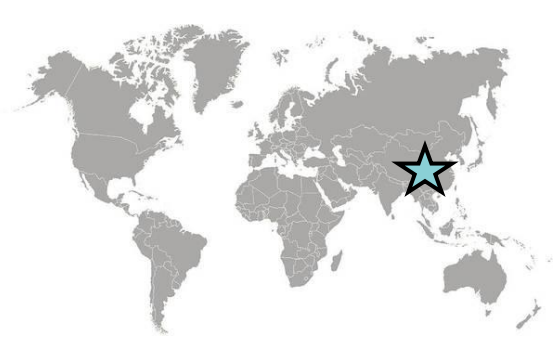
想，一周时间过去，它仍在北海的滩涂上努力地生活，并且再次被下村的村民注意到，找上我们希望能帮助到它。曾经有着吃鲎习惯的下村村民，随着鲎数量的急剧减少，下村村民们开始主动救助滩涂上的受伤鲎，还与美境合作倡导生态赶海，提醒游客“不捡鲎，不伤鲎”，成为了守护鲎的坚实力量。

祝愿这只“鲎坚强”能“坚强”到下一次、下下次蜕壳，在海洋里继续它的生命奇迹！



Xiaoyong Xie

Guangdong Province, China, PRC



In our generation, it was not easy to get into university in China. Being able to attend university was the only opportunity for many rural people to change their life's trajectory. I was fortunate enough to pursue a bachelor's degree in biology in 1994, and then furthered my studies with a master's degree in aquatic biology for three more years. Following that, I pursued a Ph.D. in Aquaculture, diving deeper into my field of expertise. However, as my specialization grew, job opportunities became scarce. After graduating, I began conducting scientific research at the South China Sea Fisheries Research Institute of the Chinese Academy of Fishery Sciences. My main task there was conducting research on the large-scale aquaculture of fish and shrimp species. I found myself constantly dealing with the monotonous routine of working with these creatures, lacking the sense of fulfillment. I had always wanted to find something I truly enjoyed doing. It wasn't until I first encountered the horseshoe crab that I discovered a strange-looking creature. Upon further exploration, I realized that, apart from being an ancient living fossil, the blood of the horseshoe crab was incredibly valuable. Surprisingly, many people were unaware of this fact, and the population of horseshoe crabs was rapidly declining. It was at this point that I realized what I should truly be doing after ten years of higher education - engaging in fundamental research on horseshoe crabs and advocating for their protection. In addition to providing policy recommendations for horseshoe crab conservation, we also established a community dedicated to their protection. Inspired by children's communities, we employed various methods to guide children in fishing villages to participate in horseshoe crab conservation. This way, the idea of protecting horseshoe crabs could spread from children to the fishing communities. Compared to the conventional method of directly promoting wildlife conservation, this approach, known as the "Horseshoe Crab Rising Children's Community," has achieved tangible results in horseshoe crab conservation. The concept of a horseshoe crab protection community is more readily accepted by fishing communities. In conclusion, I suggest organizing more activities like horseshoe crab conservation to address the conflicts of interest between humans and horseshoe crabs. Many people on the Chinese mainland are still unfamiliar with horseshoe crabs, and there are also coastal residents who are unaware of the need to protect them. By promoting and implementing such initiatives, we can raise awareness and foster a better understanding of the importance of horseshoe crab conservation.

初秋，夕阳西下，落日的余晖铺洒在一望无际的滩涂上，一个个小水洼闪烁着迷我们那个年代在中国要考上大学很不容易，能考上大学对很多农村人来说改变人生命运的唯一机会。我很幸运 1994 年本科读了生物学专业，还想深造一下又读了三年硕士水生生物学专业，紧跟着又读了水产养殖专业的博士，在专业领域里面可以说钻的越来越深入，但是就业选择却越来越少。毕业之后在中国水产科学研究院南海水产研究所里面做科研，在这里的主要任务就是做鱼虾类大宗经济品种的养殖科研，整天和虾兵蟹将打交道，工作似乎感觉不到多少乐趣。所以一直想找到一份自己喜欢的事情做，直到第一次看到鲎，一个形状如此奇怪的动物，再接触才意识到在除了古老活化石之外鲎的血液竟然非常重要，但很多人没有认识到这一点竟然放任鲎数量快速衰减。至此我找到了接受十年高等教育后自己真正应该做的事情，对社会发展有意义的事，那就是做鲎的基础研究，宣传保护鲎。中国大陆还有很多人不认识鲎，沿海居民也还有很多不知道鲎需要保护，所以在政策建议鲎保护之外，我们还组织成立了鲎保护社区，具体做法上采用了儿童社的方式，通过各种方式引导渔村小孩子开展鲎保护，从而进一步由小孩向渔民社区扩散传播鲎保护观念，与常见的直接宣传野生动物保护方式相比，“鲎起之秀儿童社”这个方式取得了实实在在的鲎保护效果，鲎保护社区概念更容易为渔民社区所接受，后面建议大家开展更多类似的鲎保护活动以解决人与鲎之间的利益冲突。



Xingde Feng

China



The horseshoe crab, also known as sea horseshoe, sea cow, sea snail, and by other names, belongs to the phylum Arthropoda, class Merostomata, order Xiphosura, and family Limulidae. It is a marine creature. The horseshoe crab possesses a hard exoskeleton composed of chitinous membrane and feeds on sea snails. Animals like sea cows, which belong to the same phylum, serve as the primary food source for horseshoe crabs living in shallow seas. The breeding season for horseshoe crabs occurs from March to April annually. Horseshoe crabs are considered rare species in China and are often referred to as "marine living fossils" or "marine elves." They are only found along the coastline of mainland China among the known species. However, for a long time, they were mistakenly considered dangerous creatures. During the late Qing Dynasty and the Republican era, people mistakenly believed that horseshoe crabs were venomous. Numerous horseshoe crab carcasses were discovered by fishermen along the coast, and they were mistakenly treated as poisonous pests. This misconception led many coastal communities in China to substitute horseshoe crabs for fish, shrimp, and other seafood. This inflicted significant harm upon horseshoe crabs, resulting in their large-scale hunting and depletion.

However, as people's awareness of marine environment and ecological conservation has increased, there is now a growing recognition that horseshoe crabs are valuable marine animals with both ecological and culinary significance. The misconception surrounding horseshoe crabs is gradually being corrected. In fact, as one of the world's largest countries in terms of horseshoe crab resources, China possesses the most abundant, complete, distinctive, and scientifically valuable horseshoe crab resources. Unfortunately, due to the lack of sufficient understanding and knowledge about horseshoe crabs, China, being the first country to list horseshoe crabs as one of the "Three Haves" protected animals, has not received the attention and protection it deserves.

During my early days in college, I had the opportunity to become a student at the Marine College of Beibu Gulf University. One day, I visited the Beibu Gulf Oceanarium and had my first encounter with these peculiar creatures. As I walked to the middle of the exhibition hall, I spotted a white creature inside a display case. It was later explained to me by a teacher that the creature was a horseshoe crab. Its black "armor" covering its entire body gave me some insight into its peculiar appearance.

In fact, back in high school, I had already learned about horseshoe crabs from the biology textbook. It mentioned that horseshoe crabs are amphibious creatures that primarily feed on sea snails. However, at that time, I didn't delve deeper into understanding horseshoe crabs. I only knew that they had a hard exoskeleton with long, pointed spines, which they used for defense and capturing prey. I considered them to be fearsome animals and never thought of getting to know or interact with them. But ever since I truly got to know and understand horseshoe crabs, I discovered that they are ancient and fascinating creatures. As an ancient arthropod, horseshoe crabs possess unique reproductive habits, with their breeding season occurring from March to April each year. Around April, male horseshoe crabs mate with female horseshoe crabs by using their hard shells, after which the females lay eggs. This process takes approximately two months, and the females stimulate the males through chemical substances secreted by their bodies, prompting the release of sperm. The sperm is then absorbed by the female's reproductive organs and expelled through the genital pore. The entire process takes about four months and is known as "gametogenesis" or "zygogenesis."

The first time I saw a live horseshoe crab was during my sophomore year when I participated in a beach cleanup activity organized by the Marine Club. I came across one tucked in the crevices of a reef, curled up and motionless, with its head tucked in. I was amazed because in my understanding, horseshoe crabs were "upside-down" creatures. It was only when I saw its tough exoskeleton that I realized what a remarkable creature it was. The hardened shell resembled a massive stone and left a deep impression on me. Later, I discovered that the horseshoe crab's exoskeleton was incredibly sturdy, adorned with numerous small protuberances. This allowed it to navigate freely in the ocean, undisturbed by external factors. On land, it used its long, rear pair of pincers for defense. When encountering predators, it would retract its pincers into its shell to protect itself. If an enemy attacked, it would withdraw its head into the shell for self-protection.

As one of the few species in the world that can be utilized, horseshoe crabs have a long history in China. However, their unique biological characteristics and scientific value have long been overlooked. In reality, the horseshoe crab population within our country has drastically declined due to human activities and environmental pollution. Therefore, for the sake of our own well-being and the prosperity of future generations, we should strive to protect the ecological environment upon which we depend. It is crucial to enhance the conservation and management of horseshoe crab species and their habitats. Only through these efforts can we effectively promote the development of our marine economy and the conservation of marine ecosystems.

鲎，又称海鲎、海牛、海蜗牛等，属于节肢动物门，甲壳纲，口足目，鲎总科海牛科的海洋动物。其具有坚硬的外壳，外壳由角质膜构成。以海蜗牛为食。生活在浅海中的海牛等节肢动物为鲎的主要食物来源。每年3-4月为其繁殖期。鲎是我国珍稀物种，其被誉为“海洋活化石”、“海洋精灵”，在我国已知的物种中仅分布在我国大陆海岸线上。然而，在过去的很长一段时间里，它却被我们认为是一种危险的动物。大约在清朝末年到民国时期，人们误以为鲎是一种有毒的动物，曾有渔民在海边发现了大量的鲎尸体，将其当作毒虫来捕拿。这种错误思想导致了我国很多沿海地区群众以食用鲎来代替食用鱼、虾等海产品。这对鲎造成了极大的伤害，导致鲎被大量捕杀。

不过随着人们对海洋环境和生态保护意识的不断提高，如今人们已经认识到鲎是一种具有重要价值和食用价值的海洋动物。而这种错误思想也在逐渐得到纠正。事实上，我国作为世界上最大的鲎资源国之一，拥有世界上最丰富、最完整、最具特色和最具科学研究价值的鲎资源。然而遗憾的是，由于人们对鲎缺乏足够认知和了解，这也使得我国作为世界上第一个将鲎列为“三有”保护动物之一的国家一直以来都没有得到重视和保护。

在我刚进入大学期间，有幸成为了北部湾大学海洋学院的学生。有一天，我去到北部湾海洋馆参观，第一次认识到了这种看着奇奇怪怪的生物。当我走到展厅中间位置时，看到一只白色的生物在橱窗里。后来，从老师那了解我才知道这只生物就是鲎。而它那全身的黑色“盔甲”也让我对它奇奇怪怪的外形有了一定的了解。

其实早在高中时，就已经学习过生物课本上关于鲎的知识。当时课本上讲到鲎是一种两栖动物，主要以海蜗牛为食。但当时我并没有对鲎有更多了解，只是知道它有一层坚硬的外壳，外壳上有一条又长又尖的长刺，刺是用来防御和捕食猎物的。那时候的我认为它是一种可怕的动物，所以从来没有想过要去了解它、接触它。但是自从真正认识并了解鲎之后，我发现鲎是一种古老又充满神秘感的生物。作为一种古老的节肢动物，鲎有着独特的生殖习性，即每年的3-4月是它的繁殖季节。每年4月前后，雄性鲎通过其硬壳与雌性鲎交配，然后产卵。这一过程需要大约两个月的时间，而雌性鲎则通过自身分泌的化学物质来对雄性鲎进行刺激，从而使得雄性鲎释放出精子。精子随后被其体内的性腺吸收，并通过生殖孔排出体外。整个过程大约需要四个月时间。这一过程也被称为“配子生成”或“合子生成”。

我第一次见到活的鲎的时候，是在我大二参加海洋协会清滩活动过程之中，当时遇见它正蜷缩在礁石缝隙中，缩着脑袋，一动不动。我感到非常惊奇，在我的认知中，鲎是一种“四脚朝天”的动物。直到我看到它那坚硬的外壳时，才意识到这是一种多么奇特的动物。那坚硬的外壳就像一块巨大的石头，深深地扎在了我的心里。之后我发现鲎的外壳非常坚硬，而它那坚硬外壳上又有许多细小的凸起。这使得它可以在大海里自由地穿梭，不受任何事物干扰。在陆地上时，它用背部那一对长长的钳子来防御敌人。当它遇到天敌时，就会把钳子缩到自己的壳中来保护自己。如果有敌人向它进攻时，它就会把头缩进壳中来保护自己。

作为世界上仅有的几种可以利用的动物之一，鲎在我国有着悠久的历史，其独特的生物学特性和科研价值一直被人们所忽略。事实上，由于受到人类活动和环境污染的影响，如今我国境内的鲎种群数量在急剧减少。因此，为了我们自身及子孙后代的健康与发展，我们应该努力保护好我们赖以生存的生态环境，并加强对鲎物种资源及其生存环境的保护与管理。只有这样，才能更好地促进我国海洋经济发展和海洋生态保护工作。

Yongquin Li (李永芹)

Lingnan Normal University (岭南师范学院)

Hong Kong



In early autumn, as the sun began to set, the lingering glow of the setting sun spread across the vast expanse of the tidal flats. The charming silver rays sparkled in the small water puddles, while playful fish and shrimp occasionally leaped out, creating shimmering silver lines. Crabs of various shapes roamed leisurely, searching for food, and timid shellfish quietly opened their shells. Healthy mangrove seedlings swayed gracefully in the gentle breeze, bringing the tidal flats to life. Unaware of the beauty around us, we diligently moved from one sampling point to another, carrying various sampling tools. Yes, we were conducting a study on benthic organisms in the mangrove forest. "Horseshoe crab!" one of my classmates shouted. Immediately, we all put down our tools and gathered around. The majority of the horseshoe crab's cephalothorax was buried in the sand, with its abdomen and long tail exposed. Its entire body resembled a ladle with a long handle resting on the beach. As I gazed at the horseshoe crab that I had longed to see, I controlled my excitement and carefully lifted it, taking photos of it from various angles. I particularly focused on clarifying the positions of its single and compound eyes, and closely observed its gill slits. Finally, I returned it to the seawater. The exhilaration of encountering a living fossil for the first time overshadowed our fatigue from sampling, making that day's work more joyful and successful.

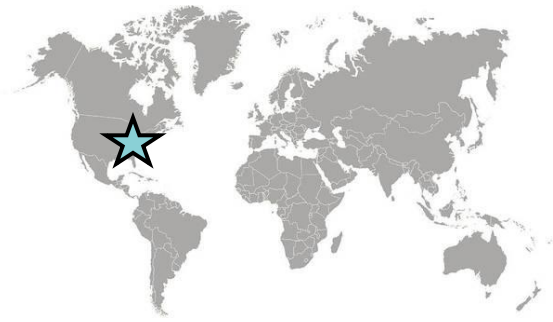
初秋，夕阳西下，落日的余晖铺洒在一望无际的滩涂上，一个个小水洼闪烁着迷人的银色光芒，顽皮的小鱼小虾不时跳出水面激起一条银线，形态各异的螃蟹悠哉游哉地横行觅食，羞涩的贝类悄悄张开了壳，茁壮的红树苗儿在



微风中摇曳生姿，滩涂上一片生机勃勃！无心欣赏美景的我们正拖着各种采样工具奋力向下一个采样点移动，是的，我们在做红树林底栖动物的调研。“鲎！”有位同学喊了一嗓子。大家立刻放下手里的工具，围了过去。只见鲎的胸甲大部分都埋在泥沙里，腹部和长长的剑尾裸露在外面，整个身体看起来像一把有着长长把手的瓢扣在沙滩上。望着心心念念的鲎，我按耐住激动的心情，小心翼翼的把它拿起来，给它们拍摄了各个角度的美照，特别分辨了一直存有疑惑的单眼和复眼位置，仔细观察了它的书鳃，最后又把它放回海水中。初见活化石的兴奋，冲淡了我们采样的疲惫，也让那天的采样变得更加快乐、顺利！

Elizabeth Hieb

Dauphin Island Sea Lab, Alabama, USA



I first remember seeing horseshoe crabs in a touch tank in an aquarium near where I grew up in Florida. Kids were allowed to gently touch the horseshoe crabs and other creatures in the tank. I also have childhood memories of seeing hundreds of horseshoe crab molts along the beaches in the Florida panhandle. I kept a few of these molts for many years. I also remember seeing horseshoe crabs and learning about them on one of my favorite television shows as a kid. I never thought I would grow up to work with horseshoe crabs or that working with horseshoe crabs would lead me to such amazing opportunities and experiences.

I have been lucky enough to travel across the world to Japan and China for two International Workshops on the Science and Conservation of Horseshoe Crabs. I have met incredible people who have dedicated their lives to researching these amazing creatures and trying to protect them. It is because of horseshoe crabs that I now know colleagues around the world who inspire me to continue working in conservation and have shown me that you can work across borders, languages, and cultures if you believe in something important.

We all co-exist with horseshoe crabs whether we find them where we live or not because we are dependent on horseshoe crabs for modern medicine. So many people have no idea that they owe their lives to horseshoe crabs. Humans and horseshoe crabs have always co-existed on this planet because horseshoe crabs have been here so much longer than we have. I am eternally grateful to be some small part of their conservation and to continue to share this world with the horseshoe crab.



Nur Syafiqah Mohamad Zul

Sabah, Malaysia



When I first encountered a horseshoe crab during my childhood, I was captivated by its dinosaur-like appearance every time my neighbor hung it outside their house. Over the years, my fascination with these creatures grew, and I developed a deep appreciation for their ancient existence. However, as I pursued my master's degree, with a project studying the population genetics of horseshoe crabs, I realized that they were facing the threat of extinction. This realization sparked a sense of urgency within me to take action and protect these remarkable creatures.

In Sabah, Malaysia, the local community has unique cultural beliefs and practices associated with horseshoe crabs. While some culture's view horseshoe crabs as symbols of protection and fertility, it is crucial to find a balance between cultural practices and the conservation of these endangered species. To live with horseshoe crabs without conflict, I believe it is crucial to engage and educate the local community about the significance of these creatures and the threats they face. By raising awareness about the ecological importance of horseshoe crabs and the need for their conservation, we can foster a sense of responsibility and encourage sustainable practices.



Ketika zaman kanak-kanak, saya amat tertarik dengan penampilan belangkas yang seakan dinasour setiap kali jiran saya menggantungnya di luar rumah mereka. Selama bertahun-tahun, daya tarikan saya terhadap haiwan ini semakin tinggi, dan saya ingin memberikan penghargaan yang mendalam untuk kewujudan kuno mereka. Walau bagaimanapun, semasa saya melanjutkan pengajian ke peringkat sarjana, dalam projek kajian genetik populasi belangkas, saya menyedari bahawa mereka sedang menghadapi ancaman kepupusan. Kesedaran ini mencetuskan perasaan yang kuat dalam diri saya untuk mengambil tindakan dan melindungi haiwan yang luar biasa ini.

Di Sabah, Malaysia, masyarakat tempatan mempunyai kepercayaan dan amalan budaya unik yang berkaitan dengan belangkas. Walaupun sesetengah budaya beranggapan belangkas sebagai simbol perlindungan dan kesuburan, adalah penting untuk mencari keseimbangan antara amalan budaya dan pemuliharaan spesies terancam ini. Untuk hidup bersama belangkas tanpa konflik, saya percaya adalah penting untuk kita melibatkan diri dan mendidik masyarakat setempat tentang kepentingan makhluk ini dari ancaman yang mereka hadapi. Dengan meningkatkan kesedaran tentang kepentingan ekologi belangkas dan keperluan untuk pemuliharaan mereka, kita boleh memupuk rasa tanggungjawab dan menggalakkan amalan yang berterusan.

Lusita Meilana

Indonesia



The first time I saw horseshoe crab was when I was a bachelor student at IPB University and was doing a practicum "aquatic invertebrate". There I felt attracted to this creature because of its unique shape and the blood utilization. Then, the faculty held a field trip to Segara Menyan, Subang, Indonesia, it was on this beach that I first saw horseshoe crab walking on the sand. At that time, we were with the fishermen who were resting on the beach. I saw with my own eyes that horseshoe crabs were entangled in fishermen's nets as a non-target species, and some fishermen ate female horseshoe crab that had eggs by burning on the beach or bring back home for family meals. Some even deliberately sell to export abroad. The fishermen said to me that in their childhood, horseshoe crabs were easier to find on the beach than they are today. This made me want to do research on this biota.

In an effort to address the Subang horseshoe crab's situation, me and team have embarked surveys on spawning habitats and adult population as a baseline data. The sampling was carried out to collect horseshoe crabs caught by fishermen from the coastal villages of Mayangan and Legon Wetan, Subang District, West Java, Indonesia. As a baseline data for the next conservation action, we obtained data by counting all entangled horseshoe crabs in fishing nets from 11 fishermen. In total, 990 individual horseshoe crabs were recorded during the three months sampling period. Reducing bycatch should be conducted in this area, particularly in feeding and spawning grounds for the crabs. It is pertinent that one protected area for horseshoe crabs should be set up especially in the shore or in shallow waters and protected from any fishing activity to help preserve their habitat and conserve the horseshoe crabs. Education as a public awareness is needed particularly for coastal communities.



Pertama kali melihat mimi/kepiting tapal kuda yaitu pada saat saya menjadi mahasiswa S1 di Institute Pertanian Bogor (IPB) dan sedang melaksanakan praktikum "avertebrata air". Disitu saya merasa tertarik dengan biota tersebut karena bentuknya yang unik dan darahnya yang vital bermanfaat bagi manusia. Kemudian fakultas mengadakan field trip di Segara Menyan Kabupaten Subang, Jawa Barat, Indonesia. Dipantai ini pertama kali saya melihat mimi hidup berjalan di atas pasir. Saat itu kami bersama para nelayan yang sedang beristirahat dipinggir pantai. Saya melihat bahwa mimi terjat di jaring nelayan sebagai non-target spesies, dan beberapa nelayan memakan mimi betina yang memiliki telur dengan cara membakar dipinggir pantai atau di jadikan menu makanan keluarga. Bahkan ada yang sengaja menjual belikan untuk di ekspor ke luar negeri. Meraka mengatakan bahwa, pada jaman mereka masih kecil, mimi sangat mudah ditemui dipantai dibandingkan saat ini. Hal ini membuat saya ingin melakukan penelitian mengenai hewan ini.

Dalam upaya untuk mengatasi situasi mimi di Subang, saya dan tim telah melakukan survei tentang lokasi pemijahan dan populasi mimi sebagai data dasar untuk peneliti selanjutnya dan perencanaan manajemen yang lebih baik. Pengambilan sampel dilakukan untuk menghitung mimi hasil tangkapan nelayan dari desa pesisir Mayangan dan Legon Wetan, Kabupaten Subang, Jawa Barat, Indonesia. Sebagai data dasar, kami memperoleh data dengan menghitung semua jumlah mimi yang terjat di jaring ikan dari 11 nelayan. Secara keseluruhan tercatat sebanyak 990 individu mimi selama periode pengambilan sampel yaitu tiga bulan. Dari sini dapat di simpulkan bahwa mengurangi tangkapan sampingan harus dilakukan di daerah ini, terutama di daerah asuh dan pemijahan mimi. Penting bahwa satu kawasan lindung untuk mimi harus di rencanakan dan implementasikan terutama di pantai atau di perairan dangkal agar terlindungi dari kegiatan penangkapan ikan. Hal ini perlu dilakukan untuk membantu melestarikan habitat dan melindungi mimi itu sendiri. Pendidikan sebagai kesadaran publik sangat dibutuhkan khususnya bagi masyarakat pesisir.

Banismita Tripathy & Alok Prasad Das

Balasore, Odisha, India



My first encounter with Horseshoe crabs was when I was 14 years old and had found this beautiful and unique crab on the beach of Chandipur, Odisha located on the east coast of the Bay of Bengal, India. I was fascinated by its unique structure as a kid but later when I started studying more on Horseshoe crab species in India, I was determined to preserve these endangered species which are slowly losing their habitats due to human interventions. A few years back, there was a lack of awareness and knowledge about the importance and conservation of these species. However, currently, there has been an enhancement in the knowledge and awareness of fishermen, local villagers, vendors and the government. This has increased conscious efforts of people in safe guarding horseshoe crab species in this coastal line. The local government has taken steps in cleaning and preserving the ecosystem as well as monitoring the catching of these crabs which greatly helps in the conservation of the Indian Horseshoe crabs. These steps are initial stages of peaceful sustenance of humans and horseshoe crab in the coastal belts of the Bay of Bengal. Many more efforts are required to confirm the successful breeding and survival of this species in future.



Naila Khuril Aini

Indonesia



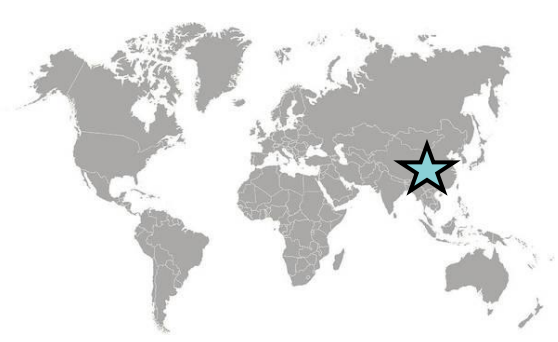
In 2018, while doing field work in Banten, it was the first time I met horseshoe crab that entangled in nets. Feeling amazement and excitement being able to touch this crab directly. Some of communities tend to still consume horseshoe crabs. However, some also realized that this animal is rare and not recommended for consumption. For example, fishermen in Balikpapan coastal areas tend to release the horseshoe crab back to the waters depend on their personal awareness as an effort to preserve it. Consistently, information about the importance of this animal has been widely disseminated and of course it is necessary to raise public awareness to participate in conserving it.

Tahun 2018 saat melakukan kerja lapang di Banten adalah kali pertama bertemu belangkas dengan kondisi terjat jaring. Terdapat perasaan takjub dan bersemangat karena dapat menyentuh hewan ini secara langsung. Kondisi masyarakat sekitar cenderung masih mengonsumsi kepiting tapal kuda hingga saat ini. Namun beberapa juga sudah menyadari bahwa hewan ini langka dan tidak disarankan untuk dikonsumsi. Salah satunya, nelayan di perairan Balikpapan cenderung melepas kembali belangkas ke perairan atas kesadaran pribadi sebagai upaya untuk melestarikannya. Secara konsisten informasi akan pentingnya hewan ini telah disebar luas dan tentu perlu memupuk kesadaran masyarakat untuk ikut serta dalam melestarikan.



三娘湾村“放蟹回家”小组

广西钦州市钦南区犀牛脚镇三娘湾村(China)



We grew up in a small coastal fishing village called San Niang Wan Village, located in the Beibu Gulf area of Guangxi. When our ancestors first arrived here, they found the scenery to be beautiful and the area to be rich in resources. So, they settled here and have been making a living by fishing for generations.

As far back as we can remember, from the fifth of May to the fourteenth of July every year, we would often see groups of horseshoe crabs coming ashore to lay their eggs. Whenever our parents returned from fishing, their nets full of seafood, there would always be a few confused horseshoe crabs that had been accidentally caught. The nets that caught them would usually need to be repaired. The accidentally caught horseshoe crabs would either end up as a meal in a restaurant's aquarium or be discarded in the trash. Year after year, as my friends and I grew up in the village, I gradually realized that with the decline of fishing resources and the destruction of the coastal environment, it has become rare to see horseshoe crabs coming ashore to lay their eggs. We can still find accidentally caught horseshoe crabs in our nets, but most of them are juveniles. In recent years, villagers have learned that horseshoe crab blood is special and is an important biological resource for developing medical diagnostic reagents - Limulus Amebocyte Lysate (LAL). As a result, there has been a growing awareness of the need to protect horseshoe crabs.

In 2019, the Farmer Seed Network came to San Niang Wan Village. After several conversations, we learned that their goal was to promote the protection and sustainable development of the marine ecosystem in San Niang Wan, Guangxi, through increased community participation. For this endangered species and for our home, we were more than happy to get involved and do something meaningful. After discussions with the Farmer Seed Network project team, my two brothers and I formed the 'Return Horseshoe Crabs Home' group. The Farmer Seed Network provided us with community funding and technical support from the Beautiful Environment and Beibu Gulf University, including a registration form for returning horseshoe crabs home and a 'Horseshoe Crab Tracking' mini-program. Every day, we waited under the ramie tree for the fishermen to return from fishing. We collected all the horseshoe crabs that had been accidentally caught in their nets, measured the width of juvenile horseshoe crabs, tagged, and weighed adult horseshoe crabs, and recorded our observations before releasing them back into the sea as a group. We have been questioned and misunderstood, but as we see the number of horseshoe crabs gradually increasing and tagged horseshoe crabs being accidentally caught again, we still want to persist. We know that our choice is right.

We are happy to report that in 2021, both the Chinese horseshoe crab and the round-tailed horseshoe crab were included in the 'National Key Protected Wildlife List' and upgraded to national second-class protected animals. Our 'Return Horseshoe Crabs Home' group has grown from the original three members to seven, and more and more fishermen in the village are getting involved. From October 2021 to March 2023, our group rescued and released a total of 7,004 horseshoe crabs back into the sea. We are willing to continue doing this, to allow this ancient creature that has lived on Earth for so long to continue to thrive in our waters for generations to come.

我们从小生活在广西北部湾海域的滨海小渔村，叫三娘湾村。我们的祖先最早来到这里时，发现这片海域风光旖旎，物产丰富，于是就在这儿定居下来，世世代代以捕鱼为生。

从我们有记忆开始，每年五月初五到七月十四，经常能在海边见到一群群上岸产卵的鲨。每当我们的父母捕鱼归来，满载海产品的虾蟹网上也总会误捕到几只迷糊的鲨，跟着渔网被带上岸，捕到鲨的渔网八成都要被补修。误捕的鲨要么在餐饮店的水族箱里被当成“盘中餐”，要么被随意丢弃在垃圾桶。年复一年，我和村里的小伙伴们慢慢长大，我逐渐也意识到，随着渔业资源的减少和滨海环境的破坏，近年来已经很少能在滩涂边发现上岸产卵的鲨的踪影了。我们倒是也能继续在渔网上面发现被误捕的鲨，但是大部分都是亚成体。近年来，村民听说鲨的血液比较特殊，是作为开发医用检测试剂——鲨试剂的重要生物资源，也开始有了保护鲨的意识。

2019年，农民种子网络来到了三娘湾村。在几次沟通中，我们了解到他们的是想通过加强社区参与，来共同促进广西三娘湾海洋生态系统的保护与可持续发展。为了这个“濒危”物种，也为了我们的家园，我们非常乐意参与其中，做一点有价值的事情。经过与农民种子网络项目组的讨论，我们好兄弟3个一起成立了“放鲨回家”小组，由农民种子网络提供社区基金，并在美境自然和北部湾大学的技术支持下给我们提供了放鲨回家登记表和“亲鲨”追踪小程序。每天，我们在黄麻树下等待渔民捕鱼归来，把被误挂在渔网上的鲨统一收回来，对亚成体的鲨测量体宽，对成年的鲨打上标签称重，做好监测记录后集体放回大海。我们也曾被质疑过、误解过，但是看着鲨数量的逐点增加，被打标签的鲨再次被误捕到，我们仍想坚持。我们知道，我们的选择是对的。

值得我们开心的是，2021年，中国鲨和圆尾鲨均被列入《国家重点保护野生动物名录》中，升级为国家二级保护动物，我们放鲨回家小组成员也从最初的3人扩大到了7人，村里也有越来越多的渔民参与其中。从2021年10月到2023年3月，放鲨回家小组一共解救并放归7004只鲨回大海。我们愿意一直做下去，让这个在地球上生活最久的古老生物世世代代在我们这片海域继续繁衍生息。

RH Carmichael

Dauphin Island Sea Lab, Alabama, USA



I first experienced horseshoe crabs when I was a kid (about 10 years old) visiting my grandparents on the Delmarva (US Atlantic) coast. My grandparents told me to stay away from the animals because they could stab me with their tails. I was fascinated by the clacking sounds made when the horseshoe crabs climbed up and over each other as they stacked up on the beach. It was 20 years later that I began studying horseshoe crabs and learned I had witnessed one small part of the largest spawning aggregation of horseshoe crabs in the world, and I finally revisited those beaches of the US mid-Atlantic coast. I have been very fortunate to study horseshoe crabs from their northern to western-most habitats in the US and visit some of their habitats in Asia. Horseshoe crabs have been my scientific and

cultural ambassadors for population dynamics, trophic ecology, and conservation science, as well as for global travel and making life-long colleagues and friends. The best way to live with horseshoe crabs without conflict is through education; raise awareness of values, threats and approaches for protection of at-risk species and their habitats.



Dorkas Kaiser

Germany



Unfortunately, I have the great misfortune to live in a country without horseshoe crabs!!

When I was preparing my diploma thesis, I dealt with these primeval animals for the first time. My first thought at the time was, "What strange, dangerous-looking animals."

When I finally held the first small horseshoe crab in my hands and was able to take a good look at it, I immediately thought: "Hard shell, soft core".

And the longer I was lucky enough to study these cuties in their natural habitat in the Philippines, the prettier and more impressive I found them to be.

So, it was love at second sight -- I had a desire to stand up for these magnificent animals that are so helpless in the face of human influence.

And how do I feel today?

"A country without a horseshoe crab is like a home without a dog"

Leider habe ich das große Pech, in einem Land ohne Pfeilschwanzkrebse zu leben!!

Bei der Vorbereitung meiner Diplomarbeit, beschäftigte ich mich das erste Mal mit diesen urtümlichen Tieren. Mein erster Gedanke war damals: „Was für seltsame, gefährlich aussehende Tiere“.

Als ich endlich den ersten kleinen Pfeilschwanzkrebs in den Händen hielt und ihn genau betrachten konnte, dachte ich sofort: „Harte Schale, weicher Kern“.

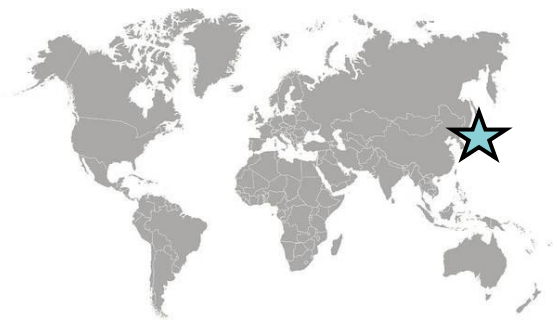
Und je länger ich das Glück hatte, diese süßen Tiere in ihrem natürlichen Habitat auf den Philippinen zu studieren, desto hübscher und beeindruckender fand ich sie. Es war also Liebe auf den zweiten Blick – ich hatte den Wunsch, mich für diese großartigen Tiere einzusetzen, die dem menschlichen Einfluss so hilflos ausgeliefert sind.

Und wie fühle ich heute?

„Ein Land ohne Pfeilschwanzkrebs ist wie ein Heim ohne Hund“

Masaaki Mihata

Yamaguchi City, Japan



I don't clearly remember where I saw it, but do remember that as a child, I thought, "what a strange animal!" when I came upon a horseshoe crab specimen. Later, I became a junior high school science teacher and was transferred to a school near the seashore. At the school science lab, I found some works on horseshoe crabs by students. The living fossil do exist close by!

I asked about it, and was ensured that they were around here. I was guided to their habitat, but since it was around May and they were not there yet. July arrived. They are here! We went to the coast, and there was a dead horseshoe crab. I was so happy to find it and took it to the lab to make a dry specimen. However, it stunk to heaven and was difficult to keep it at the lab. I took it outside. Soon after this incident, I was introduced to Harada-sensei who's been active in studying and protecting horseshoe crabs in Yamaguchi Prefecture. He suggested me to try raising horseshoe crabs with Science Club students.

Harada-sensei taught us how to raise and take care of horseshoe crabs and I've kept raising horseshoe crabs for several years with my students. It was a fuss to keep living animals, but after my retirement, these struggling days are now good memories. In order for many more people to be interested in horseshoe crabs, I started making art - paper crafts of horseshoe crabs and extinct animals. Now I also make locomotive models and dolls for a local touring office. My interest extends from ocean pollution to environmental issues and I learned how to make movies with materials I've collected for these interests. Through my activities, I made friends in and out of Japan.

It's been 9 years since I retired as a teacher. Now I help the Kabutogani watching events hosted by Harada-sensei. I also collect data on the patterns on horseshoe crab carapace, thinking to identify and categorize the patterns by using AI technology. For this project, I will increase my outings to the shore to collect more data. I will also put more efforts in making better Kabutogani paper crafts. (Translation by YI)

どこで見たのか記憶がさだかではありませんが子供の頃カブトガニの標本を見て不思議な生物だなと思ったことを覚えています。そして中学校の理科の教師になり海辺の学校に転勤。理科室に生徒がカブトガニについて調べた文書を発見。生きている化石が身近にいる！早速聞いてみると確かにいるとのこと。案内してもらいましたが5月頃のことで見つからずに過ぎました。そして7月。いたよ！との知らせで海岸に出かけると死骸がありました。大喜びで乾燥標本にと持って帰りました。しかし腐臭がひどく理科室では無理。屋外へ退避。そうしているうちに山口県でカブトガニの研究と保護活動をしていらっしゃる原田先

生を紹介していただきました。科学部で子供達にカブトガニを飼育させてみたらという提案をいただきました。飼育方法も伝授していただきそれから数年生徒達と飼育研究を行いました。卵から育てることも行いました。いろいろ大変なことも多かったのですが退職した今は貴重な思い出となっています。個人的に環境問題を考える教材にならないかと試行錯誤してみましたが研究発表で内容を盛り込みすぎて大失敗。これは苦い思い出。さて、興味関心を持ってもらうためにカブトガニのペーパークラフトを作ったことから古生物をペーパークラフトにしてみることや発展して現在行っている観光ボランティア用にSLや人形を作ってみたりしています。また海の汚染問題から環境問題へと視野が広がり集めた資料でビデオで作品を作る方法も学ぶこともできました。カブトガニの保護活動を通じて国内や海外の方々とお友達になれたことも私にとっては嬉しい出来事でした。

教師を退職して9年が過ぎました。今は時々原田先生が主催するカブトガニ観察会をお手伝いしたり、前体にある模様を使った分類が可能なのかという疑問を持って資料を集めています。AIによる画像分析にすごく期待をしているところですが、サンプルがすくないのでこれからも海岸に出かけて資料を増やしていきたいです。また、以前にこしらえたカブトガニの進化を追ったペーパークラフトも機会があれば手直しをしていきたいと思っています。

Hironori Yokoo

Sasebo City, Japan

Chair, Association for the Protection of Horseshoe Crabs in Sazagawa



The first time I encountered with horseshoe crabs, it was when I was in an elementary school, I remember.

It was a horseshoe crab left out on the seawall upside down by a local fisherman. It was caught in a gillnet. That is when I met a horseshoe crab. I was only a child, but remember thinking "why was it thrown out when it's still alive?" and returned it to the sea.

After some years later, I am now studying the horseshoe crab and its ecology with children as the chairman of the "Association for the Protection of Horseshoe Crabs in Sazagawa."

カブトガニと初めて出会ったのは、小学校の頃だと記憶します。

漁師さんが、刺し網で掛かったカブトガニを防波堤の上にひっくり返して放置してあったのが、最初の出会いです。子供ながら「なんで、まだ生きているのに捨ててあるの？」と考えながら海に戻した記憶があります。

そんな出来事から数十年後、「さざ川のカブトガニを守る会」の会長として、カブトガニの生態を子供たちと勉強しております。

佐々川のカブトガニを守る会
会長 横尾 博宣



産卵場のゴミ拾い

Beach cleanup on the horseshoe crab spawning area.

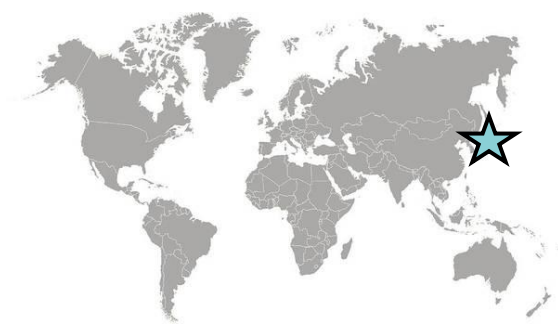


カブトガの生態を勉強中

Gathering to learn about horseshoe crabs.

M.Y.

Takehara City, Hiroshima, Japan



Takehara West Elementary School is located close to the Kamogawa River in Takehara City, Hiroshima, Japan. At this estuary, we have mudflats called Hachi-no Higata.

Since 2020, 5th graders from our school have visited Hachi-no Higata to observe the nature and to participate in activities for learning local environment and ecology. We learn about names of the species that live in the mudflats and their ecology from Hiroshima University professors.

There are many different species in the mudflats, and we are lucky to have encountered with horseshoe crab juveniles for 3 years in a row!

We wish that "Kabutogani" will continue to thrive in our community as they are our precious treasure.

M. Y. 竹原市

竹原西小学校は、竹原市を流れる賀茂川の近くにある学校です。

賀茂川の河口に「ハチの干潟」と呼ばれる干潟があります。

令和2年度から毎年、5年生がハチの干潟に観察をしに行って地域の環境について学ぶ活動をしています。

広島大学の先生方にハチの干潟で見つけた生物の名前や生態などについて教えていただいています。

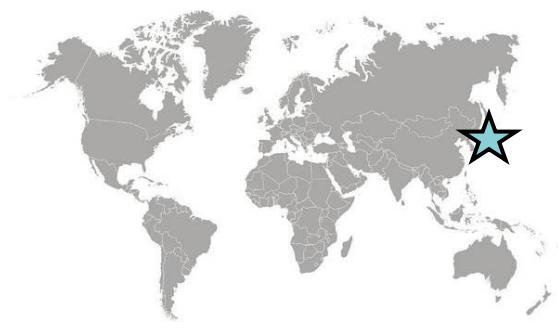
干潟にはいろいろな生き物がいますが、3年連続でカブトガニの幼生と出会うことができました。

これからも地域の貴重な宝として、カブトガニに元気に育ってほしいと思っています。

Y.H.

Imari City, Japan

Imari Lions Club



Introducing our horseshoe crab conservation activity

I became participating in the activity for the conservation of horseshoe crabs after joining the Lions Club which has been consecutively doing the beach clean-up at the horseshoe crab spawning sites every year.

Even before this, I knew that horseshoe crabs lived around here, but they were a distant existence and I was not interested in them. However, as I continued my participation in the beach clean-up, I became aware that the local administration, community, students, companies, etc. were deeply involved in the conservation of horseshoe crabs.

I am determined to conserve and protect this precious sea in which horseshoe crabs can continue thriving in this steadily changing environment on Earth.

カブトガニの保護活動について

私がカブトガニの保護活動に関ったのは、ライオンズクラブに入会してからで地元のクラブが生息地の清掃作業を毎年欠かさず行っていたからです。

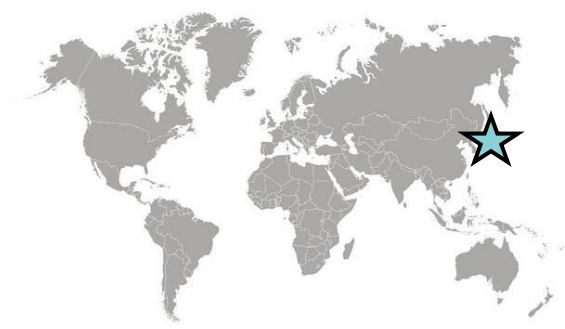
以前から、カブトガニが生息していることは知っていましたが、直接の関りは無く、興味もありませんでした。しかし、清掃活動を続けて行くうちに、行政、地域、学生、企業等が保護活動に深く関り、大切に守っていることを知りました。

地球環境が徐々に変化していく中、これからもカブトガニが生息していける大切な海を守って行こうと思います。（伊万里ライオンズクラブ Y・H）

Sou Uesugi

Kita-Kyushu, Japan

High school sophomore



I was in elementary school when I met Kabutogani for the first time. It was at the spawning horseshoe crab watching event at Sone Higata. With its strange appearance and behavior, I fell in love with it.

These days, I describe and explain horseshoe crab, its behavior and such to people who come to study Kabutogani or to participate in Kabutogani watching events.

最初にカブトガニに出会ったのはたしか小学生の頃に曾根干潟のカブトガニ産卵観察会でした。見た目や生態が面白くすごく好きになりました。今では調査に参加したり産卵観察会などではカブトガニの生態などを来た人達に説明したりしています。（北九州市在住、高校2年・男性 上杉 壮）

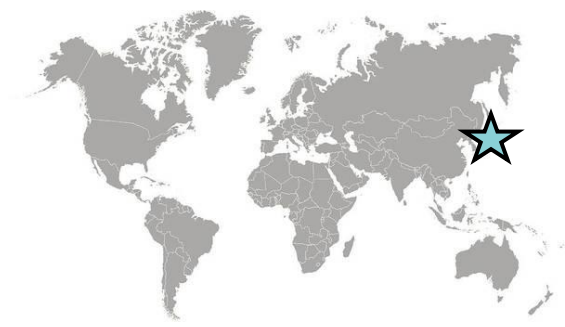


とっておきの一枚 【夜間に産卵するカブトガニのつがいを自分で見つけた！】
My best shot: I found them by myself! A spawning Kabutogani pair at night.

Ryo Udoyama

Kita-Kyushu, Japan

High school freshman



I was a 1st grader when I saw horseshoe crabs for the first time. That was when I went to the horseshoe crab watching event with my brother.

At that time, I only felt that they were mysterious, but since then my curiosity toward them grew bigger and bigger. Now they are a part of the essence in my life.

私が初めてカブトガニに出会ったのは、小学校1年生で兄と一緒に地元の観察会に行ったときです。その時は、ただ不思議でしかない生き物でしたが、それからどんどん興味がわき、今では切っても切りはなせない存在になりました。（北九州市在住 高校1年生 獨活山 凌）



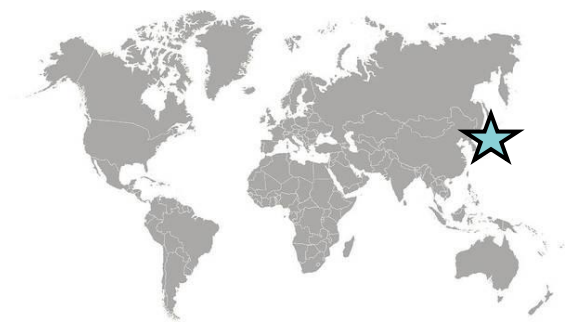
とっておきの一枚 【架橋工事が進む河口で産卵するカブトガニ】

My best shot: spawning horseshoe crabs at the estuary with a bridge under development.

Kazunori Takeuchi

Imari City, Japan

Chair, Imari City Association for the Conservation of Horseshoe Crab



My Kabutogani story

In Imari City, we count the number of spawning horseshoe crab pairs that come to visit our shore. This is because they are the indicator of the health of the sea environment in Imari. For the past 2 years, we've counted approximately 1500 pairs visiting, and I think our sea in Imari has been improving.

We call our horseshoe crabs "Hachi game" since the time immemorial. Hachi in Japanese means a bowl [*Imari is famous for its porcelain, Imari ware]. It was called so perhaps because the shape of horseshoe crabs looked like a bowl.

Back in the old days, there was a sweet shop called "Sanoya" which sold "Hachi game sablé" cookies, shaped in a horseshoe crab. I still remember how tasty it was.

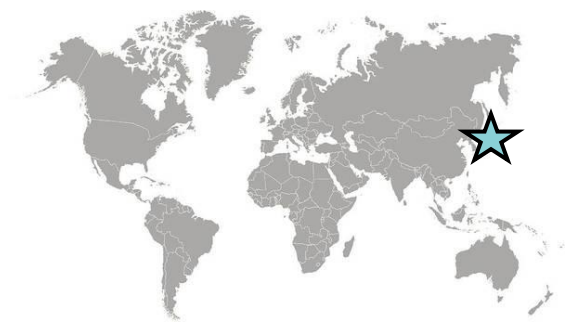
カブトガニとのエピソード

伊万里では、毎年産卵に来るカブトガニのつがい数をカウントしています。それは、伊万里の海の環境のバロメーターだからです。ここ2年、1500位のつがいが出ており、相当伊万里の海の環境は良くなっていったと思います。

また、伊万里では、カブトガニのことを昔から「ハチガメ」と呼んでいます。焼物の里の鉢のような形のカメのような生物だったからでしょう。昔「さのや」さんというお菓子屋さんに「ハチガメサブレ」というお菓子があり、形はカブトガニのようでしたがとても美味しかったことを覚えています。(伊万里市カブトガニを守る会 会長 竹内和教)

Shungo Takahashi

Kita-Kyushu, Japan



To me, as a person who grew up on an island in the Seto Inland Sea, I was familiar with Kabutogani; however, they have become somewhat uncommon before I knew. When I paid attention to Kabutogani again was when I became a teacher and had a chance to teach a passage, "Protecting Kabutogani" by Keiji Tsuchiya-sensei in the 4th grade Japanese language class. Then I was transferred to a school closest to the Sone Higata from 1993 to 1998. This was my turning point to get whole-heartedly involved in the conservation and protection of Kabutogani in the Sone Higata, in addition to offering classes on mudflats.

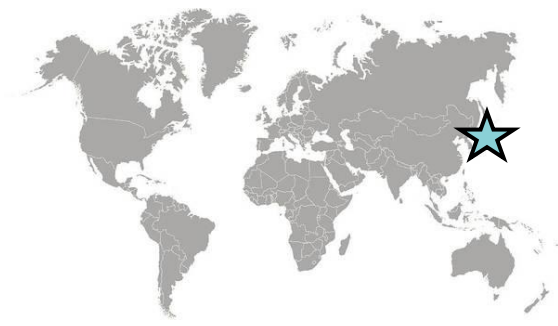
In order to save the sea where horseshoe crabs live for the future, I will spend the rest of my life to work hard as a keeper of the Sone Higata.

瀬戸内海の島で育った私にとって、カブトガニは身近な存在でしたが、それがいつの間にか遠い存在になっていました。再びカブトガニが身近になったのは、小学校の教師になって、4学年の国語の教科書で土屋圭二先生の「カブトガニを守る」という説明文を児童に教えるようになったこと。そして1993年～98年、曾根干潟に一番近い学校に赴任したことが、干潟の教育を始め、曾根干潟のカブトガニの保護や保全活動に本格的に取り組むきっかけになりました。

カブトガニの棲む海を未来に残すため、これからも、残りの人生を曾根干潟の守り人として頑張っていきたいと思います。(福岡県北九州市在住 高橋俊吾)

Ryoji Sakami

Imari City, Japan



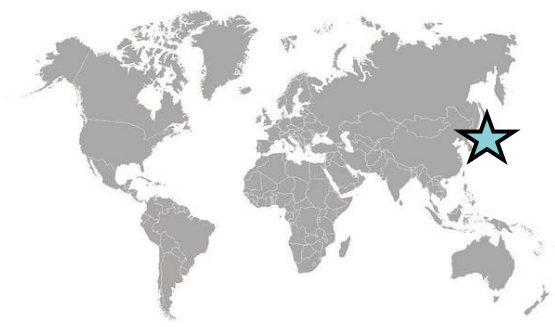
As a high school science teacher, I was transferred to a high school where horseshoe crabs are their research subject. For more than 40 years since then, I've been involved in this animal and become interested in it. Currently, I work as the secretary of the Japan Society for the Conservation of Horseshoe Crab, but in the meantime, I continue to survey horseshoe crabs in the Imari Bay and teach people how important it is to protect and conserve Kabutogani and its environment.

高校の生物科の教員としてカブトガニを研究テーマにしている高校に赴任してから、カブトガニと関りを持ち、その魅力に惹かれ、すでに40年以上ちかくなります。現在は、日本カブトガニを守る会の事務局長をしながら、伊万里湾のカブトガニの現況調査続け、その保護の大切さを訴えています。

佐賀県伊万里市 酒見良司)

Maki Oono

Kita-Kyushu, Japan



Since when I was a child, I've been fond of the Sone Higata mudflats which have been displaying a dream-like, beautiful scenery where a diverse group of organisms has been gathering. Among them, there was always a Kabutogani.

We would like to continue doing what we can to preserve the sea of Sone Higata as a special destination for Kabutogani.

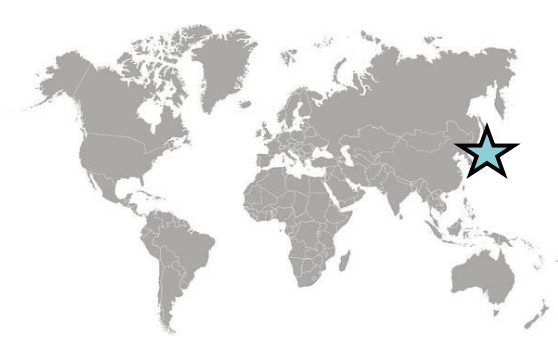
私は子どもの頃から、多種多様な生き物が集う、幻想的で美しい光景を見せてくれる曾根干潟をこよなく愛してきました。その中にいつもいたのはカブトガニの姿でした。

曾根干潟の海が、カブトガニにとっていつまでも特別な存在であるように、私達は私達にできることをこれからも取り組んでいきたいと思います。（福岡県北九州市在住 大野真紀）

Seisuke Miyahara

Saza Town, Nagasaki, Japan

5th Grader



The Living Fossil: Kabutogani

1. Introduction

The horseshoe crab prospered in the Paleozoic Era, evolved from its trilobite ancestor and hasn't changed its looks over 200 million years. This is how it's called a living fossil. Currently, there are only 4 species in the world.

2. Longevity and Habitat

Horseshoe crab's longevity is estimated at 25 years.

In the present-day Japan, they can be spotted frequently in Okayama Prefecture and Yamaguchi Prefecture.

In the northern Kyushu, they inhabit in Saga Prefecture, Nagasaki Prefecture, Fukuoka Prefecture, and Oita Prefecture.

3. Feeding

Shortly after hatching, horseshoe crab babies will eat planktons in water columns and/or other organisms in the substrate. When they grow bigger, they eat polychaetes, bivalves, sea urchins, seaweeds, etc.

4. Molting

Horseshoe crab males molt 14 times, and the female 15 times. The female grows slightly bigger than the male.

Conclusion

It is estimated that the current number of horseshoe crab individuals is approximately 4000. We learned that their habitat has been shrinking due to the development and other activities along the shore by humans.

From this research, I decided to be more conscious about how to trash garbage so as not to spoil the sea, but take care of it.

Notes:

Seisuke-kun was 5th grader when he reported this. He was inspired by his visit to the House of Horseshoe Crab in Imari, and was heartfelt when he witnessed horseshoe crab spawning activities at the Sazagawa River estuary. He loves organisms and knows a great deal about fossils and extinct species.

生きた化石 カブトガニ 宮原 誠助

① はじめに
カブトガニは古生代に栄えた三葉虫の祖先から分かれ、億年以上も昔からそのすがたが変わらないうちに生きています。現在は世界に4種類しかみられません。

② 寿命と生息地
寿命は約25才です。現在の日本では、岡山県山口県で多く見られます。北九州では佐賀県長崎県福岡県大分県に生息しています。

③ 食べ物
産まれたばかりの間は海中のプランクトンや泥の中にいる生物を食べています。大きくなるとゴカイ類のほかに、ウニ、海そうなども食べています。

④ 脱皮
オスは14回、メスは15回脱皮し、メスがやや大きくなります。

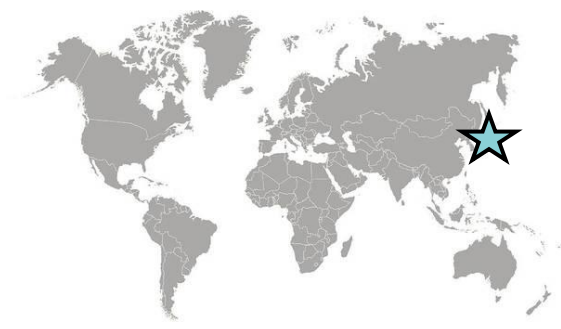
まとめ 現在のこ
体数は約4000匹
との事です。これは
開港などにより住
む場所が少なくな
ってきているからと
の話がありました。
今回この自由研
究を通してゴミを
すてないように海
を大切にしようと思
います。

宮原君がこのレポート(小学校5年生の時に製作)を製作されたきっかけは伊万里のカブトガニの館に見学に行ったことと佐々川の河口でカブトガニの産卵を見て感動したことです。元々宮原君は生き物好きで、古生物や絶滅危惧種にも詳しいとのこと。

Sadamu Matsumoto

Imari, Japan

Chair, Imari City Board of Education



When I was little, I acknowledged the existence of "Kabutogani" and thought they were everywhere in our everyday life. Then I was transferred to Makishima Elementary School where I happened to handle Kabutogani of Makishima as an education tool in moral education.

As a treasure of Imari, Kabutogani is protected by a number of conservation groups, to which I appreciate so much. The Biology Club at Imari High School (Science Division) is participating in our conservation activities in Makishima. Their involvement is highly valued as an example of succession of conservation efforts to the next generations. I would like to spread the word about our activities to many more people out there, in hope that some of them will join us. (Interviewed by Koyo Funai, written by Akari Naganuma; Japanese translation by Y.I.)

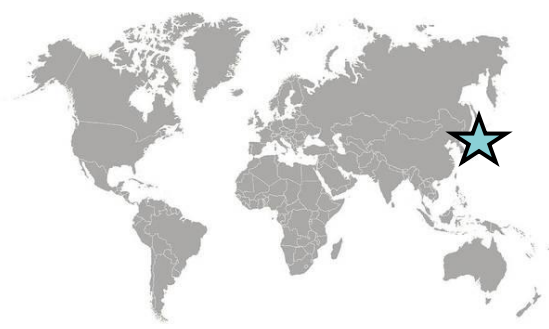
国際カブトガニの日2023 伊万里市教育長談話

小さい頃は「カブトガニ」がいることは認識していましたが、身近で当たり前存在するものだと思っていました。カブトガニが貴重な生物だということを意識したのは、牧島小学校に赴任後、道徳教育で、牧島のカブトガニを教材として扱ったのがきっかけでした。

伊万里の宝であるカブトガニは、複数の保護団体により守られ、大変感謝いたしております。保護活動には、伊万里高等学校理化・生物部も参加しており、次世代への継承という点で非常に大きな存在です。今後は、これらの活動をさらに発信し、保護活動の輪を広げていければと思います。

伊万里市教育長 松本 定
(聞き取り：船井 編集：長沼)

Students at Makishima Elementary School Imari City, Japan



Kabutogani Flag

Every year, students at Makishima Elementary School in Imari City, Japan supply illustrations of Kabutogani to complete a Kabutogani Flag. The flag is created and set up to attract attention from people for the awareness of horseshoe crab conservation.

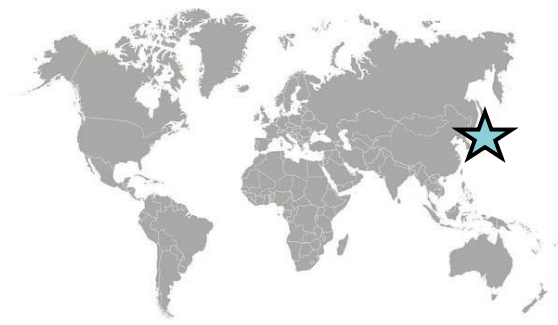
カブトガニのぼり旗

毎年牧島小学校の児童にカブトガニの絵を描いてもらい、カブトガニの保護を呼びかけるのぼり旗を作成し、設置しています。



K.Y.

Sasebo City, Nagasaki, Japan

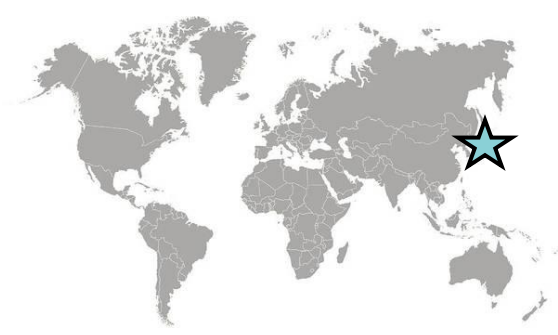


The first time I saw horseshoe crabs was when I was as first grader. There were a few horseshoe crabs in the water-filled footbath at the school. I remember my homeroom teacher talking about “living fossils” and “natural monuments.” I’m not particularly fond of living creatures, but I think the reason I remember the scene at that time was because it left a deep impression on me. Now I work at an aquarium which exhibits and researches horseshoe crabs and I look for an opportunity to go research with the keepers. (Sasebo City, Nagasaki, Japan. Company employee, Female, K.Y.)

私をはじめ、カブトガニを知ったのは小学1年生のときです。学校の水を張った足洗い場にカブトガニが数匹入っていました。担任の先生が「生きた化石」、「天然記念物」という話をされたのを覚えています。特に生き物が好きというわけではないのに、その時の光景を覚えているのはとても印象に残ったからだと思います。カブトガニの展示・調査をしている水族館で働いているので、飼育員と一緒に調査に行きたいと思っています。（佐世保市在住、会社員、女性、K.Y.）

Haruka Kubozono

Tokyo, Japan



Ever since when I saw horseshoe crabs at Sone Higata mudflats in Kita-Kyushu, Fukuoka, I have been enchanted by this creature. Later, with the help from people at Fukuoka Branch of the Japan Society for the Conservation of Horseshoe Crab, my curiosity knew no limit into it. With my mind set to "study and research horseshoe crabs someday," I studied hard and got admitted to good schools - from junior high school to high school to university. At the university, I was so grateful that I finally made it to study population dynamics of horseshoe crabs.

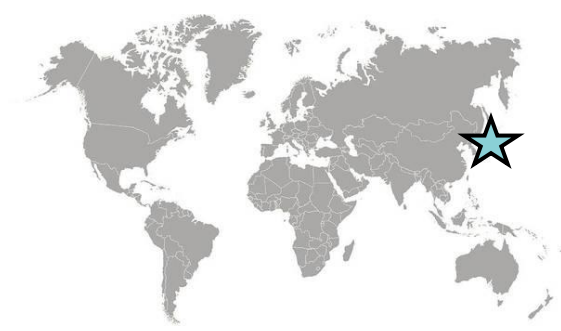
小学2年生のときに、初めてカブトガニを曾根干潟で見ながら、すっかり虜になりました。その後も日本カブトガニを守る会福岡支部の方々のおかげで、カブトガニへの興味は尽きることなく、「いつかカブトガニの研究をしたい」という一心で、中学受験・高校受験・大学受験を乗り越えました。大学では念願叶って、カブトガニの資源量推定の研究ができて嬉しかったです。（文京区在住、会社員・女性 久保園 遥）

Mareki Koga

Imari City, Japan

High School Senior

Biology Club, Imari High School (Science Department)



Imari City, Saga Prefecture is where I live and is known as one of the prominent horseshoe crab spawning sites. Every year, from June into August, many horseshoe crabs visit here to spawn. The Biology Club at Imari High School (Science Department) to which I belong records the number of visiting individuals and uses the data for studying their ecology.

The number of visiting horseshoe crabs is increasing these days - we recorded 1519 pairs in 2021 and 1442 pairs in 2022. I hope that many more horseshoe crabs will continue to visit here in Imari to spawn.

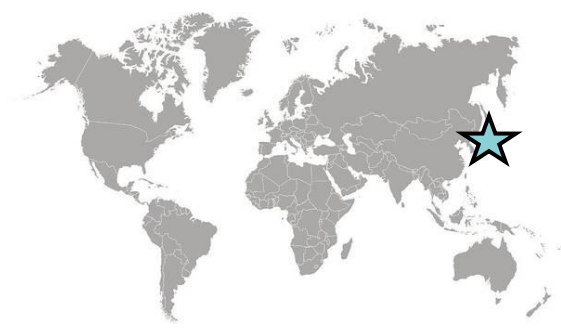
Night-time survey of Kabutogani (*Tachypleus tridentatus*)

○カブトガニ (*Tachypleus tridentatus*) の夜間調査

伊万里高等学校理化・生物部 3年 古賀 希紀



私たちの住む佐賀県伊万里市はカブトガニ (*Tachypleus tridentatus*) の日本有数の産卵地です。毎年、6月から8月にかけて、多くのカブトガニが産卵に訪れます。私たちの通う、佐賀県立伊万里高等学校理化・生物部では、毎年その数を記録し、カブトガニの生態研究に役立てています。その数は、1519つがい (2021)、1442つがい (2022) と、近年その数は増えています。これからも多くのカブトガニが産卵に来ることを祈っています。



Shuntaro Koga, et al.

Imari City, Japan

High School Sophomore

Biology Club, Imari High School (Science Department)

This picture shows our beach clean activity at a horseshoe crab spawning site. Every year, from June to August, we have many horseshoe crab pairs coming to our beach for spawning. Because the beach littered with drifted materials, including marine trash, will prevent them from laying eggs, volunteers from Imari High School clean the beach on a regular basis. We are working hard to look forward to another visit from spawning horseshoe crabs this year.

Beach-clean volunteering at horseshoe crab (*Tachypleus tridentatus*) spawning site

○カブトガニ (*Tachypleus tridentatus*) の産卵地清掃ボランティア

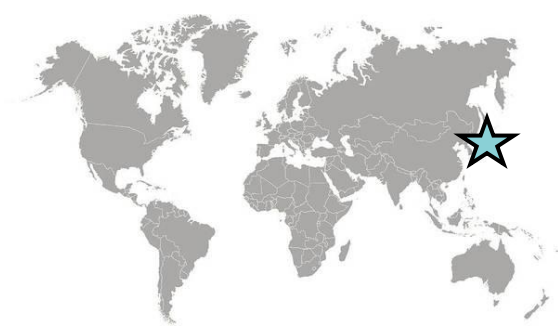
伊万里高等学校理化・生物部 2年 古賀 俊太郎ほか



これは、カブトガニの産卵地である海岸を清掃している様子です。毎年、6月から8月になると多くのカブトガニが産卵に訪れます。その際、砂浜にゴミが多く漂着していると、産卵の妨げとなるので、伊万里高校の有志で定期的に清掃活動を行っています。今年も多くの産卵つがいを訪れることを期待しながらボランティア活動がんばります。

K.H.

Sasebo City, Nagasaki, Japan



I encountered with horseshoe crabs when I started working at an aquarium. Before that, I knew that the species exist, but didn't know that horseshoe crabs live in the water of Kujukushima, so close to where I lead my own life. When I found a figure of juvenile horseshoe crab on the mudflats for the first time, I was very moved. I will continue to watch carefully out for the

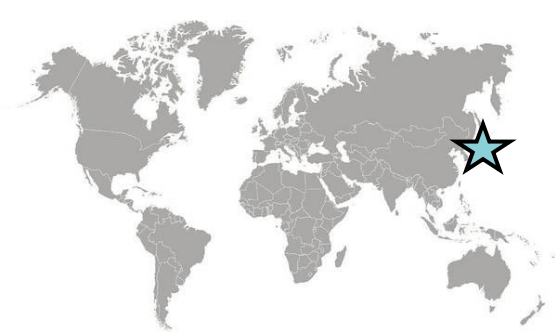


environment where they live, so that we all can continue to live together with horseshoe crabs, whose lineage has been around on this earth long before the arrival of us, humans.

カブトガニは水族館で働くようになってから出会いました。それまではカブトガニそのものの存在は知ってはいましたが、私が生活しているすぐそばの九十九島海域にもいるとは全く知りませんでした。初めて干潟で幼生の姿を見つけたときは大変感動しました。人間が誕生するよりもはるか昔からこの地球上にいるカブトガニとずっと一緒に生きていけるよう、カブトガニを取り巻く環境をこれからも見守っていきたいと思います。（佐世保市在住、会社員・女性 K. H)

Biology Club, Imari High School (Science Department)

Imari City, Japan



At our Biology Club, Science Department, Imari High School, we conserve a partial portion of horseshoe crab eggs laid during the spawning season, raise them at the school, and release them next July. The collected eggs will molt the next year and become 2nd instars. We release thousands of 2nd instars every year with a help from local citizens. Through this annual activity, perhaps, the number of spawning horseshoe crabs has been increasing. We will steadily and surely continue this activity.

Releasing horseshoe crab juveniles

○幼生放流

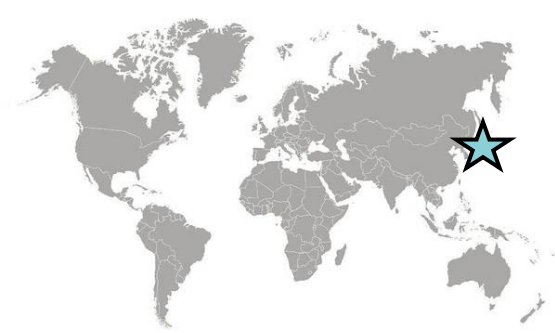


伊万里高校理化・生物部では、産卵された卵の一部を保護し、学校で孵化させ、翌年の7月に放流する活動を行っています。採卵した翌年に1度脱皮した2齢幼生を、地域の方々の協力を得て、毎年数千個体の二齢幼生を放流しています。その甲斐あってか、近年産卵に訪れるカブトガニの数が増えてきました。今後も地道に続けていきたいです。(伊万里高等学校理化・生物部)

Yuushi Ikeda and Kodai Yamaguchi

Imari City, Japan

High School Seniors, Biology Club, Science Department, Imari High School



The picture is showing us measuring temperature and salinity of seawater at the horseshoe crab spawning site. Based on the collected data, we study environmental conditions for spawning horseshoe crabs. The results we obtained tell us that horseshoe crabs tend to spawn when the seawater temperature is above 25 °C and the salinity above 1.7%. We will continue collecting data for further study.

○海水温・塩分濃度調査

Study in the temperature and salinity of seawater

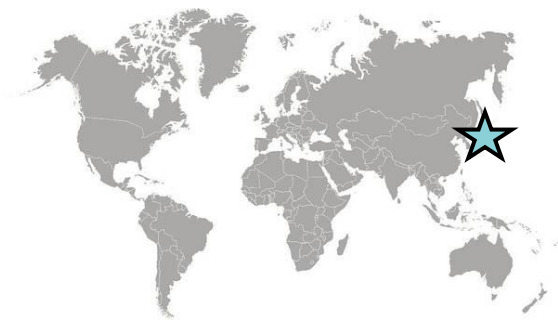
伊万里高等学校理化・生物部 3年 池田 祐春・山口 恒大



この写真はカブトガニの産卵地の水温や塩分濃度を測定している様子です。この結果から、カブトガニの産卵条件などを調べています。結果から、カブトガニは、海水温が25度以上、塩分濃度が1.7%以上になると産卵するということが分かりました。今後も引き続いて調査研究を行ってきます。

Osamu Hayashi

Kita-Kyushu, Japan



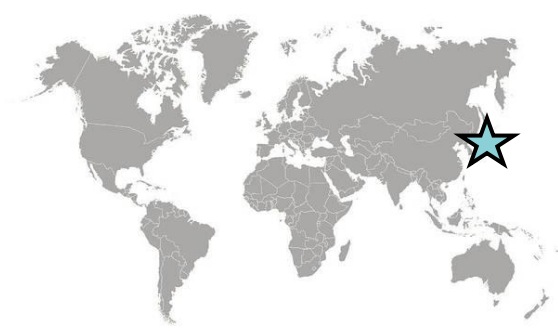
Kabutogani, whose lineage goes back to millions of years, thrives now in Sone Higata with benthic organisms, fishes, and birds.

億年の命を繋ぐカブトガニは、曾根干潟でベントスや魚や鳥たちと今を生きています。



H.A.

Sasebo City, Nagasaki, Japan



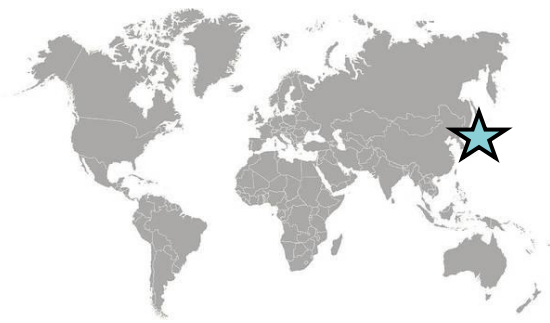
It wasn't until I started working at my current aquarium that I observed horseshoe crabs and their habitats. I have been interested in living things since I was a child, and I knew about the existence of horseshoe crabs. I remember being thrilled to see many horseshoe crabs in the sea near my workplace, and to find such a good environment left for them to survive. By working together with the local community, we hope to protect this precious natural environment and pass it on to future generations.

カブトガニとその生息場所を実際によく観察したのは、現在の水族館に勤務してからです。小さい頃から生物に関心があり、カブトガニの存在自体は知っていましたが、職場のすぐ周辺の海で多くのカブトガニが観察でき、また、そのカブトガニが生きていける良好な環境が残っていることに驚いた記憶があります。地域と連携を図ることで、このような貴重な自然環境を守り、後世に伝えていければと考えています。（佐世保市在住、会社員・男性 H. A.）

Akihiro Kawakubo

Sasebo City, Nagasaki, Japan

President, Sasebo Pearl Sea Corporation



Horseshoe Crab and Me - my first encounter with a horseshoe crab

It was 37 years ago when I was working at a fish market, I was driving a car to go to work. Then I found something - a shadow - in the middle of the road, wriggling. I stopped the car to see what it was, and approached to it. It was an alien-like creature, turned upside down. Just imagine how shocked I was when I saw it!

This is the very first scene when I met a horseshoe crab which I immediately understood what it was. Perhaps it dropped from a truck's carrier going to the fish market, I supposed.

Five years since that experience, I started working at an aquarium. I couldn't shake off that piece of memory from my mind about a horseshoe crab on the road, and therefore, started leading a horseshoe crab survey. Today I got promoted to a company president and don't go out on the field as much as before, but am still involved in it - organizing the horseshoe crab survey as a company's project, sending our staff to the field investigation, and telling them its importance for the conservation of the horseshoe crab and its ecology. I myself go out in the field as much as possible as my time allows me to to regularly relieve myself from daily stress. It heals my soul to be out where they are.

私とカブトガニ

私とカブトガニの出会い

今から37年前、私が魚市場に努めていた時、出勤のため真夜中に車で走っていると、町の真ん中の道路上で何やらワサワサとうごめいている影を見つけて、何だろうと思い車を停めて近づいてみたところ、仰向けになったエイリアンみたいな生き物でビックリしたのは言うまでもありません。

これがカブトガニと意識して出会った最初の場面です。たぶん市場に出荷に行くトラックからこぼれ落ちたものと思っています。

それから5年後、水族館で働くようになってから、以前の出会いが頭から離れずに、調査を始めることになりました。現在は経営者となり、現場に出ることがあまりできなくなりましたが、当社スタッフにはフィールドでのカブトガニ調査を会社の事業として取り組み、保護につなげていくように話しております。私自身もできるだけ時間を作ってフィールド調査に出て、ストレスを定期的に抜いて、癒されています。

させぼパール・シー株式会社

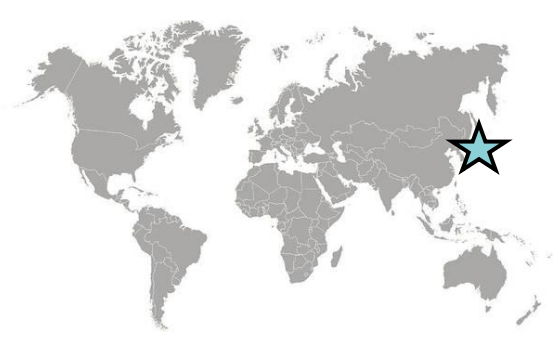
代表取締役 川久保 晶博



Hiroobu Fukaura

Imari, Japan

Mayor, Imari City



I know about horseshoe crabs since I was a child. When I was at elementary school, I saw them often on the beach at Gigiga Beach in Matsuura City. Also, they were caught in the fishing net of my grandfather who made a living with fishing and farming in Ogushigo, Kawatana (in Omura Bay, south of Sasebo City) which is my father's hometown. I was a student at Imari High School and watched activities by the Biology Club and thought it was a very precious species.

The recent increase in the number of horseshoe crabs in and around Tataro Coast is very good news, and I think it is thanks to the efforts by people in the conservation groups. The City of Imari would like to support the efforts by everyone who are there to protect and conserve this living fossil.

(Interviewed and written by Koyo Funai, Japanese translation by Y.I.)

国際カブトガニの日2023 伊万里市長談話

カブトガニは子供のころから知っています。小学生の時には、松浦市のぎぎが浜海水浴場で何度も見ました。また、父親の故郷である川棚町小串郷で半農半漁を営む祖父の漁網にかかっていたのをよく見ました。伊万里高校の生徒の時には生物部の活動等を見て貴重な生物だと知りました。

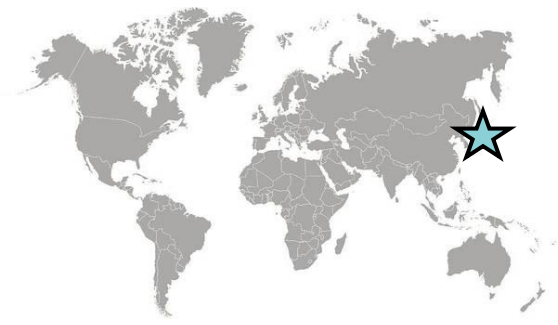
ここ数年、多々良海岸周辺でのカブトガニつがい数の増加は大変喜ばしいことで、保護団体の方々の成果であると思っています。生きている化石をみんなで守ろうとしていることに対し、伊万里市としても応援していきたいと考えています。

伊万里市長 深浦弘信（聞き取り編集 船井向洋）

Makishima Elementary School

6th Graders

Imari, Japan



Tomoya Okino

Wonder of Kabutogani

I learned that many Kabutogani live along the coasts of Kyushu. Earlier, I thought they live only in Saga Prefecture, but now I know that horseshoe crabs live in other parts of the world. I also learned that in Japan, they used to live in the Seto Inland Sea and northern Kyushu, but because of the rapid environmental destructions in their habitat, their number and habitat are progressively being reduced. I will continue to raise horseshoe crabs with care and hope that such destructions of their habitat will cease.

Ema Hajiguchi

Wonder of Kabutogani

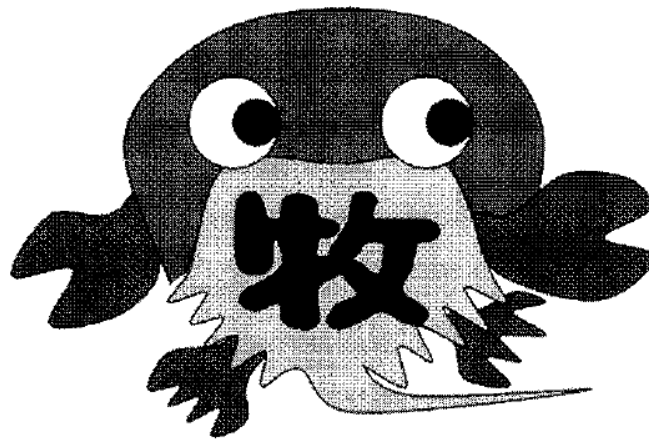
I am happy to learn things I didn't know about Kabutogani. The most astonishing thing was that there are 4 species of Kabutogani, tri-spine horseshoe crab, American horseshoe crab, Southeast Asian horseshoe crab, and mangrove horseshoe crab. There are 14 horseshoe crab sites. They also live in Makishima, and I'd like to study them and take care of them, so that they can grow healthily.

Yukino Matsuo

Horseshoe crabs can be found in warmer water in the Seto Inland Sea and Northern Kyushu. Even though the species are different, horseshoe crabs in Japan and other parts of the world have a similar shape which I think is charming.

Our horseshoe crabs prefer a warmer environment and start moving around when the seawater temperature is above 18°C. They become active between June and September, but bury themselves in sandy substrate and hibernate during the colder season, from October to June. The fact that most of day they are resting is one of their characteristics.

Since I learned that they are a precious species on the verge of extinction, I'd like to take a better care of them more than ever.



Ayano Matsuo

About Kabutogani

There are 4 species of horseshoe crabs, of which American horseshoe crab is said to live 20 to 40 years. Horseshoe crabs eat polychaetes (marine worms) and other small animals. Their diet is rather omnivorous than carnivorous and eat bivalves, snails.

Hinata Toriyama

Secrets of Kabutogani

I learned that horseshoe crabs are not crabs at all. They are categorized into a group called Chelicerata, and closely related to spiders, scorpions, and ticks. I was wondering why horseshoe crabs look very ancient, and did some research and learned that their shape hasn't been changed much since 450 million years ago. That is the reason why they appear so ancient. The blood from horseshoe crabs has been used in the pharmaceutical development. If they die out or their number reduced, we will be in trouble. For the well-being of horseshoe crabs and ourselves, our ocean must be kept clean.

Yuuki Tsugami

Surprising Kabutogani

Horseshoe crabs as species are Chelicerata, not Crustacea. They are more closely related to spiders and scorpions.

Horseshoe crab juveniles are called trilobites because of their looks. Earlier, phylogenetically horseshoe crabs used to be grouped together with Trilobita, but now they are in different groups. And because of its Japanese name, Kabuto-gani, and its appearance, horseshoe crabs are often confused with Kabuto-ebi (*Triops*, freshwater crustacean). And horseshoe crabs do have a juvenile stage called trilobite!

The horseshoe crabs we are raising molted only a few times, and I'd like to see them grow bigger.

Eren Taguchi

Let's find more about Kabutogani!

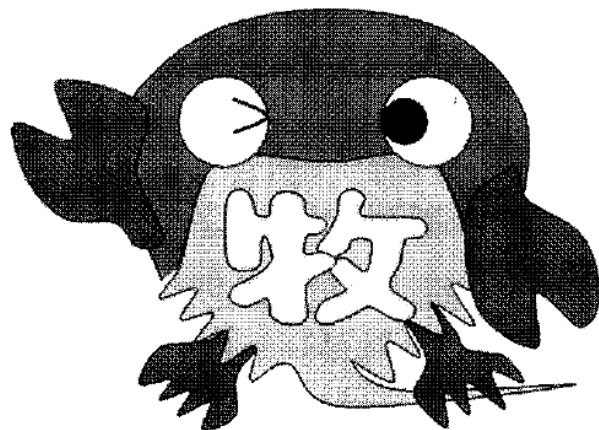
I found out that horseshoe crabs are arthropod.

I also learned that their blood is blue.

Their body is covered by hardened chitinous material, and segmented in 3 main parts - prosoma (anterior body), opisthosoma (abdomen), and telson (tail). The length of prosoma and opisthosoma together is 35 cm, and telson, 35 cm which make them 70 cm total in length.

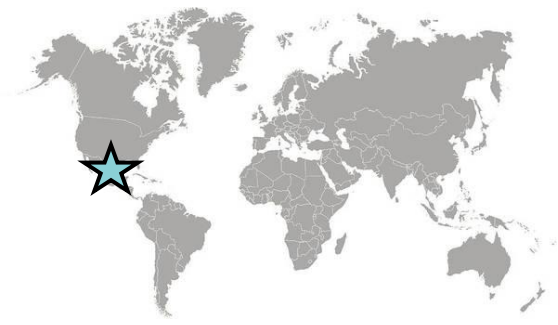
I am glad that I was able to learn a lot about horseshoe crabs.

Since we keep and raise some horseshoe crabs at our school, I will do so with a lot of care.



Carmen Olivia Rosas Correa

Mexico



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BIOSFERA AMBIENTAL

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LA CACEROLITA DE MAR, CAMINANDO EN LA CUERDA FLOJA DE LA EXTINCIÓN.

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¿Alguna vez te has imaginado convivir con un animal muy antiguo? En nuestro maravilloso planeta tierra, existe uno cuyos ancestros llegaron a convivir con los dinosaurios, esos gigantes animales que desde niños a todos nos han fascinado.

En México esta especie está incluida en el grupo de los Xifosuros, y es mejor conocida como cacerolita de mar (*Limulus polyphemus*), llamada así por la forma de su cuerpo, en maya la llaman mex. Su coloración es verde olivo y su cuerpo lo podemos observar con tres divisiones conocidas

como prosoma ("cabeza"), opistosoma ("parte media") y telson ("cola"). Cuenta con 4 pares de patas, un par de pedipalpos (en los machos en forma de gancho, y en las hembras en forma de pinza), así como un par de queliceros, motivo por el cual está más emparentada con los arácnidos que con los crustáceos. Tiene un par de ojos que puedes observar a simple vista, pero en todo su cuerpo encontramos aproximadamente 9 en total.

Una de las características aún más interesante es la coloración de su hemolinfa (sangre), ya que dentro de su cuerpo es transparente, pero al extraerla y tener contacto con el oxígeno se torna de una coloración azul debido a la hemocianina la cual es una proteína rica en cobre. La hemolinfa una vez procesada, es utilizada en la industria farmacéutica para detectar patógenos y toxinas en dispositivos médicos, vacunas y otros medicamentos.



Habita principalmente en zonas de manglar, en sitios arenosos y fangosos, se alimenta principalmente de mejillones, gusanos marinos, algas, pequeños cangrejos, entre otros. Si vives en la costa de la Península de Yucatán es muy probable que la conozcas y quizás hayas nadado por encima de ella, ya que prefiere mantenerse enterrada.

En época de reproducción, preferentemente en luna llena, suben a la playa, la hembra acompañada por el macho y bien sujetado a ella, sin embargo, a su alrededor puede haber otros machos también dispuestos a conquistarla. La hembra cava un hoyo de aproximadamente 25 cm de profundidad y coloca cientos de huevecillos, los



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cuales son fertilizados por el macho. La supervivencia no es muy alta, ya que estos diminutos huevos sirven de alimento para las aves playeras y migratorias que aprovechan el momento de anidación para obtener energía y continuar con su largo viaje. Por esta razón la cacerolita de mar es fundamental en el aspecto ecológico, si ella desaparece del planeta, como fichas de dominó afectaría a otras especies.

Desafortunadamente se encuentra en la categoría en Peligro de Extinción, de acuerdo a la Norma Oficial Mexicana 059- SEMARNAT-2010 y en la lista roja de especies amenazadas de la Unión Internacional para la Conservación de la Naturaleza (UICN) se encuentra como vulnerable.

¿QUÉ ESTÁ OCURRIENDO CON LA ESPECIE?

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En la Península de Yucatán, la destrucción de manglares, la construcción de puertos, la infraestructura urbana y turística y, la contaminación, las actividades turísticas en playas y lagunas costeras, así como la falta de educación ambiental, ha llevado a esta especie como a muchas otras, a una situación crítica por la pérdida de su hábitat. Otro problema grave al cual se enfrenta, es la sobreexplotación para su uso como cebo o carnada para la pesquería de pulpo.

Los ancestros de esta especie se adaptaron muy bien al medio (quedando demostrada su permanencia desde hace más de 450 millones de años). Nosotros, los seres humanos la estamos encaminando a la extinción.

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¿QUÉ PODEMOS HACER?

Proteger a la cacerolita de mar a través de esfuerzos colaborativos en conservación de sus poblaciones y hábitats, a partir de la investigación, educación y en la sensibilización del público en general para conocerla y valorarla en su historia evolutiva, la ecología costera marina y sus usos biomédicos sostenibles.

Evitar el turismo de alto impacto en playas de anidación y su extracción en esta práctica pesquera que realmente están influyendo en la disminución drástica de su población. Para ello se deben generar soluciones que permitan poner en marcha iniciativas de ecoturismo, dándole valor a las especies en su hábitat natural. Las cacerolitas valen más vivas que muertas. Observarlas es transportarse en el pasado y disfrutarlas puesto que la forma de su cuerpo no ha cambiado desde la era Paleozoica, siendo verdaderos seres prehistóricos que merecen continuar en este planeta.



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[Critical Habitats: Reproduction and Nesting Beaches of the Horseshoe Crab \(*Limulus polyphemus*\) in Champotón, Campeche, México](#)

[Genetic study of the American horseshoe crab throughout its Mexican distribution. Conservation and management implications](#)

[First reports of a spawning site of *Limulus polyphemus* at Ría Lagartos Biosphere Reserve, Yucatan, Mexico](#)

[¡Extinción a la vista! Cacerolita de mar en México](#)



THANK YOU TO THE HORSESHOE CRAB LOVERS
AROUND THE WORLD FOR SHARING YOUR STORIES

HAPPY INTERNATIONAL HORSESHOE CRAB DAY