California Academy of Sciences launches scientific expedition to the Philippines

April 29 2011

The coral reefs surrounding the Philippines are home to more species of coral than any other known place on Earth, including this Cespitularia coral. Scientists from the California Academy of Sciences are currently searching for new species in this biodiversity hotspot. Credit: Gary Williams, California Academy of Sciences

Today, scientists from the California Academy of Sciences will launch the most comprehensive scientific survey effort ever conducted in the Philippines, documenting both terrestrial and marine life forms from the tops of the highest mountains to the depths of the sea. They will be joined by colleagues from the University of the Philippines, De La Salle University, the Philippines National Museum and the Philippines Bureau of Fisheries and Aquatic Resources, as well as by a team of Academy educators who will work to share the expedition's findings with local

community and conservation groups. The expedition, which will conclude with a symposium at the University of the Philippines on June 8, is funded by a generous gift from Margaret and Will Hearst.

"The Philippines is one of the hottest of the hotspots for diverse and threatened life on Earth," says Dr. Terrence Gosliner, Dean of Science and Research Collections at the California Academy of Sciences and leader of the 2011 Philippine Biodiversity Expedition. "Despite this designation, however, the biodiversity here is still relatively unknown, and we expect to find dozens of new species as we survey the country's reefs, rainforests, and even the ocean floor. The species lists and distribution maps that we create during this expedition will help to inform future conservation decisions and ensure that this remarkable biodiversity is afforded the best possible chance of survival."

As forests fall and oceans heat up, life in many parts of the world is slipping away. From birds and bees to frogs and fishes, species are disappearing thousands of times more rapidly than they have for more than 65 million years. As these species go extinct, we are not only losing members of our family tree—we are also losing potential medical treatments, agricultural pollinators, oxygen producers, soil servicers, and many other critical components of healthy, functioning ecosystems. Tragically, we are losing most of these species before we've had a chance to document their presence, determine what roles they played in their ecosystems, or discover the potential services and products they could have provided to humans.

Despite intensive efforts to document life on Earth, scientists estimate that more than 90 percent of the species on this planet have yet to be discovered. In order to make smart decisions about how to conserve what is left of our planet's biodiversity, we must make a concerted effort to rapidly increase our knowledge about these life forms and their distribution. This is the motivation behind the Academy's 2011

Philippine Biodiversity Expedition, which aims to dramatically improve our understanding of one of the most species-rich places on Earth. The 42-day expedition to the Philippines will focus on documenting life in the country's tropical rainforests and coral reefs—the two most diverse types of ecosystems in the world—and will also examine deep-water diversity adjacent to these reefs.

The expedition's shallow water team will conduct most of their research off the coast of Batangas Province on Luzon Island, in an area called the Verde Island Passage. Past research by scientists from the California Academy of Sciences and other institutions has suggested that this area is the "center of the center of marine biodiversity," home to more documented species than any other marine habitat on Earth. However, many new species remain to be discovered—Academy scientists regularly find at least one new species on every dive in this area. During the expedition, the participating scientists will conduct side-by-side surveys of marine protected areas and non-protected areas to help the government determine how successful their current conservation plans are at fostering biodiversity.

"The expedition's results will help our government better promote integrated coastal resource management," said Malcom Sarmiento, Director of the Philippines Bureau of Fisheries and Aquatic Resources. "The data they collect will also help us decide if and where to establish new sanctuaries."

In addition to surveying the region's fish, corals, sea slugs, sea urchins, and other marine invertebrates, the shallow water marine team will also investigate the diversity of microscopic algae known as zooxanthellae that live within the tissues of corals and many other marine invertebrates. Zooxanthellae not only lend their color to their hosts—they also provide significant nutrition as they photosynthesize and share the resulting glucose and amino acids. During times of environmental stress, such as

the rising seawater temperatures of global climate change, hosts may lose their zooxanthellae, a condition known as bleaching. Bleached corals are a prime indicator of stressed reefs; hosts that have lost their zooxanthellae are weakened and more susceptible to disease and death. Sampling these microscopic algae as well as their hosts will allow Academy scientists to better understand zooxanthellae diversity and how it relates to their hosts' resistance to increasing water temperatures and other environmental stress.

Meanwhile, the expedition's terrestrial team will be busy surveying rainforest habitats in several different locations across Luzon Island, including forests on Mt. Banahaw, Mt. Makiling, Mt. Tabayoc, and Mt. Pulag. These high-elevation peaks are home to some of the most pristine cloud forest habitat in the Philippines and provide a refuge for a great many plant and animal species. While scientists have conducted limited survey work on most of these mountains before, especially to document larger animals like birds and mammals, these regions have never been explored by a multi-disciplinary scientific team on this scale. Indeed, there is no comprehensive list of plants for any of these forests, and no surveys have ever been conducted for insects or arachnids.

The terrestrial team scientists will focus on identifying and mapping flowering plants, mosses, spiders, insects, amphibians, reptiles, and small mammals. Many of these groups are known to have high levels of species diversity and endemism (meaning they cannot be found anywhere else on Earth), and it is likely that many new species remain to be discovered. All of them are threatened by human population pressure and natural resource exploitation—even inside the boundaries of many national parks, where logging and subsistence farming are fairly regular occurrences. The team's research will help the Department of Environment and Natural Resources in the Philippines better manage their protected areas and enforce their conservation policies. Additionally, the expedition's educators will organize meetings with local

schools, community groups, and national park employees in order to foster appreciation for and deeper knowledge about the spectacular biodiversity in their backyards.

During the deep-sea portion of the expedition, the scientists will board a research vessel owned by the Bureau of Fisheries and Aquatic Resources, the M/V BA-BFAR, and set out to conduct a survey of the deep waters around Lubang Island. Scientists have only recently begun to explore the deep sea, and the vast majority of deep sea organisms remain to be discovered. Indeed, far less than 1 percent of the world's deep sea environments have been scientifically investigated. Over the course of eight days, the expedition's deep-sea marine team will survey the waters around Lubang Island at depths of up to 2,000 meters in search of deep-sea fish, corals, barnacles, sea stars, and other invertebrates. While sorting specimens on the deck of the boat, the scientists are sure to find a wide variety of strange species that have never before been documented.

On June 8, the Academy's 2011 Philippine Biodiversity Expedition will conclude with a symposium at the University of the Philippines, during which the preliminary results from the expedition will be presented. The symposium, titled "The Status of Philippine Biodiversity in the Face of Climate Change: State of Knowledge and Conservation Challenges," will also include an examination of the current challenges with respect to conservation of the Philippines' unique biota, as well as discussion about more effective strategies to mitigate the projected impacts of climate change.

Provided by California Academy of Sciences