



THE NEW YORK BOTANICAL GARDEN

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## **New Study Chronicles the Extraordinary Plant Diversity Found in Pohnpei, Federated States of Micronesia**

### **Botanical Garden Scientist and Collaborators on the Decade-Long Research Project Report on the Global Lessons to Be Learned from Remote Pacific Area**

A recently published study by the University of Hawaii Press/The New York Botanical Garden, *Ethnobotany of Pohnpei: Plants, People and Island Culture*, discusses the unusual plant diversity of Pohnpei Island, a small Micronesian island in the Western Pacific Ocean, along with the consequences of the introduction of other plant species by humans, and the implication these discoveries have on the rest of the world. The authors of this study, including 19 Pohnpeians and additional 11 scientists from around the world, record for the first time on this island how some of the plants are being used as local medicines. They also identify a trajectory for a sustainable future through conservation efforts underway.

Some of the revelations chronicled in the study, the result of a decade long project led by Dr. Michael J. Balick, The New York Botanical Garden's Vice President for Botanical Science, Philecology Curator, and Director of the Institute of Economic Botany, include:

- Pohnpei Island, a tiny speck of land totaling 138 square miles in the Western Pacific, is home to 62 unique plant species that grow nowhere else in the world. In fact, 15% of Pohnpei's native flora is endemic—found only on that island. (By comparison, in New York State, an area approximately 400 times larger than Pohnpei, there is only one single endemic plant species known to exist.)
- One out of every five plants on the island are used as local medicines—206 species of plants, most recorded for the first time, have been employed to treat a variety of health conditions as part of traditional Pohnpeian healing practices.
- Of the total 975 different plants that grow on the island, 550 are plant species that have been introduced by humans, resulting in a changing landscape over the recent past.

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- In Pohnpei, an island that contains the highest percentage of “areas of biological significance” in the region, conservation efforts have been promising, with forest clearing due to agricultural production declining by nearly 50% since a conservation program was implemented in the mid 1990’s.

As James S. Miller, Vice President and Dean of Science at The New York Botanical Garden, noted, “This is a case study in the field research we do at the Botanical Garden and how it can help in our efforts to conserve the global environment. We applaud the interest the people of Pohnpei have in actively conserving a very important group of endemic plant species and the native habitats where they are found.”

### **Pohnpeian Plants as Medicines**

Throughout the ages, Pohnpeians have used local plants as medicines, for treatments ranging from common conditions (such as toothaches, headaches, and vaginal infections) to more complicated conditions (such as arthritis, gastrointestinal infections, diabetes, and anxiety). This is an integral part of Pohnpeian culture, and a way that they can treat primary health care issues sustainably using local resources.

As is happening in many areas around the world, however, elders who know the uses of these herbs are dying off before training the next generation. The authors and investigators involved in this project have gathered information on the traditional uses of plants—including their healing properties—with information on preparation and dosage. As a project directed by the Pohnpei Council of Traditional Leaders (*Mwoalen Wahu Ileilehn Pohnpei*), the group of that governs traditional life on the island, the intention was to document Pohnpeian healing systems with specific information on ingredients and treatment regimens, so that future generations would have access to the resources that have sustained their ancestors and provided health care for hundreds of years, and that their wisdom would not disappear.

With the publication and planned widespread distribution of *Ethnobotany of Pohnpei*, this goal is being achieved. As part of the project, health care professionals worked with the local medical community in Micronesia to develop a model for combining traditional medicines with modern pharmaceutical medicines and treatments, through an approach known as integrative medicine. This volume is the tool that will allow health care professionals to evaluate the traditional remedies using an evidence-based

approach, and adopt the most appropriate into local clinics. Based on the research presented in this study, a primary health care manual from Pohnpeian plants is being prepared at The New York Botanical Garden, in collaboration with The Beth Israel Continuum Center for Health and Healing in New York City and the Pohnpei State Hospital.

### **A Foundation for Sustainable Future**

Knowledge of healing plants is not the only concern. As the study points out, edible plants are at risk, and islanders could face shortages of food in the future unless immediate action is taken. For example, yams have always been a primary food source of Pohnpeians. A 1988 farm survey on the island recorded 179 local yam cultivars—different types of yams developed and identified by farmers. However, due to disease, neglect, and globalization over a period of 16 years, by 2004 only 23 cultivars—13% of the numbers recorded in 1988—survive today, a disappearance of nearly 10 valuable yam cultivars per year. Yam cultivation practices must be encouraged and preserved for the future generations—and local people must gain respect for their traditional foods, to replace their dependence on imported foods (canned meats and vegetables, polished white rice, sodas, and beer), the consumption of which has helped bring an epidemic of serious health issues to the island, such as diabetes (one in three adults), hypertension (one in four adults), and obesity (42% of adults).

*Ethnobotany of Pohnpei* discusses the work of the Island Food Community of Pohnpei in reinvigorating interest in traditional foods—yams, breadfruit, bananas and taro—edible species that are nutritious, health promoting, and reduce dependence on costly outside imports. For example, the diversity of bananas on Pohnpei is astonishing—there are over 50 distinct banana cultivars growing on the island. One, locally named *Karat*, has a rich yellow-orange flesh. Recent laboratory studies presented in this book show it to have the highest levels of provitamin A carotenoid (such as beta-carotene) content in the world—100 times more than commercially produced bananas. This and other rare Pohnpeian cultivars can be used to treat nutrition-related disorders, such as vitamin A deficiency, which may lead to increased respiratory and skin infections, and blindness. Bananas such as *Karat* can be transplanted to other tropical regions around the world where vitamin A deficiency is a serious health problem.

### **Lessons for the Larger World; Climate Change Impact Looms**

There are many lessons for the rest of the world waiting to be learned from what is happening in this remote area of the Pacific. Dr. Balick notes, “To the average citizen of the United States, the effect that

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global change will have on our lives is still a theoretical issue, and in some circles is dismissed as having no basis in fact. On Pohnpei, change has already come—with a vengeance. For example, massive tidal surges along a 5,000 mile-wide front overwhelmed the low lying atolls of Pohnpei State and many other parts of the Pacific in early December 2008, breaching seawalls, and pouring seawater into agricultural fields, ruining 100% of the crops such as taro that sustain local populations. In this area, the abundance of fish has been reduced, rain patterns altered, temperatures more extreme, invasive species threaten the native vegetation, and drinking water supplies reduced, all putting local people in harms' way.”

Dr. Balick continues, “What we can learn from Pohnpei’s experience is that islands are vulnerable to global change in a way that continents, with their vast size and resilience, are not. The lessons from what is happening today on small islands must not be ignored, for to do so would be to turn a deaf ear to the ‘canary in the coal mine’ that is trying to warn us of greater harm to come. Computer simulations of what might happen to the coastal United States during a tidal surge are important tools for planning, but great lessons can also be learned from experiencing these calamities first hand today on a small island such as Pohnpei. Thankfully, the local government and traditional leaders on the island recognize the dangers ahead and are taking steps to address them with the limited means at their disposal.”

**This project, founded and directed by local traditional leaders, has provided some of the tools to address conservation and public health issues currently facing Pohnpei. Project supporters include the V. Kann Rasmussen Foundation, The MetLife Foundation, The Gildea Foundation, The Marisla Foundation, The Prospect Hill Foundation, and The Philecology Trust.**

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The New York Botanical Garden is an advocate for the plant kingdom. The Garden pursues its mission through its role as a museum of living plant collections arranged in gardens and landscapes across its National Historic Landmark site; through its comprehensive education programs in horticulture and plant science; and through the wide-ranging research programs of the International Plant Science Center. For more information, please call 718.817.8700 or visit our Web site at [www.nybg.org](http://www.nybg.org).

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