

NYBG

FOR IMMEDIATE RELEASE: September 18, 2023

NYBG Scientists and International Partners Document How Plants Are Used on Islands in the Pacific Nation of Vanuatu as Climate-Change Resilient Indicators for Activities Essential to Livelihoods Such as Hunting, Fishing, and Planting Crops

In the First Study of Its Kind, the Researchers Created a Comprehensive Record of 111 “Calendar Plant” Species, Helping to Highlight and Preserve an Indigenous Knowledge System That Has Relevance for Other Nations Grappling with Climate Change



Species of “calendar plants” used in southern Vanuatu as indicators for various agricultural, hunting, and other activities include (left to right) *Metrosideros vitiensis*, *Urena lobata*, and *Hedyccarya dorstenioides*. Photos by Gregory M. Plunkett, Ph.D., and Wayne Law, Ph.D.

Bronx, NY—Three New York Botanical Garden (NYBG) scientists and their colleagues have conducted the first study to comprehensively record how Pacific islanders use plants as time indicators to guide such essential activities as when to hunt and fish for certain animals and the best time to plant various crops. NYBG’s Vice President for Botanical Science and Director and Senior Philecology Curator of the Institute for Economic Botany Michael J. Balick, Ph.D.; Director and Curator of the Cullman Program for Molecular Systematics Gregory M. Plunkett, Ph.D.; and NYBG Affiliate Scientist K. David Harrison, Ph.D., of VinUniversity in Hanoi, Vietnam, and their collaborators documented 111 species of what they call “calendar plants” in Tafea, the southernmost province of the Southwestern Pacific nation of Vanuatu. Their findings, which are based on extensive interviews with 127 Tafea residents, are available in “Calendar Plants in Southern Vanuatu,” published in the peer-reviewed research journal *Economic Botany*.

The team, which included researchers from the Vanuatu Department of Forests, Vanuatu Cultural Center, and local Indigenous experts, noted that, unlike standard reckonings of days and weeks, calendar plants are “flexible frameworks” because they adapt their fruiting and flowering times to changes in the local climate, an important quality that could provide Tafea

residents with greater resilience in the face of global climate change.

References to calendar plants and their uses are abundant in Pacific anthropological literature, but until now, no study has attempted to systematically record a region's calendar-plant inventory. The researchers conducted interviews and collected plant specimens in eight linguistically and culturally distinct communities on the islands of Aneityum, Futuna, and Tanna, the three southernmost islands of Tafea province.

One important reason for documenting and disseminating this Indigenous knowledge is the role calendar plants can play in fostering resilience to global climate change. An advantage of using plants as guides to various activities is that they can adapt to changes in local weather. For example, the paper points out that in one area of Tanna, precipitation was much higher in 2022 than usual, and a number of calendar plants gave their signals later than usual. That meant people planted their gardens later than usual, and the crops did well.

"Rather than conducting a particular agricultural activity on the same...date each year, calendar plants serve as reliable guides as they respond to peculiarities in weather that also affect crop plants," the scientists write.

Of the 111 plant species that serve as environmental or cultural time-cues, most (66 species) involve plant signals that are guides to hunting birds and fruit bats because a large number of flowering and fruiting plants are food sources for these animals. The research team also documented plant species that are cues for agricultural activities, such as planting and harvesting crops, gathering wild plants and fungi, and fishing for or harvesting various marine species.

Among speakers of the Nafe language on Tanna, for example, the flowering of a plant they call *nawawa* (*Metrosideros vitiensis*, a shrub or tree in the myrtle family of plants) means that taro, a root vegetable that is a food staple in the region, is ready to be harvested. In some cases, the researchers found that the same plant can indicate different things to more than one Indigenous group. When speakers of Netwar in western Tanna see the sprouting seedlings of *Urena lobata*, a shrub commonly known in English as Caesarweed or Congo jute, they know that it is time to plant various crops. On Aneityum, however, the appearance of the plant's delicate flowers and its fruit indicates that the cyclone season has passed.

Even neighboring peoples on the same island can find dramatically different associations with a plant's annual development and the ecosystem of their local area. On Tanna, speakers of Naka know that it is a good time to hunt birds when fruit appears on the plant they call *negapup* (*Hedycarya dorstenioides*, a tropical tree or shrub). The island's Nafe speakers watch for the same plant, which they call *kapuapu*, to flower, a signal that sea urchins are fat and ready to be harvested.

The research team documented that some calendar plants play a role in the sustainable management of marine life. On Aneityum, for example, when the leaves of *Terminalia catappa*, a large tropical tree commonly known in English as Indian almond, change colors and fall from the tree, people know that it is time for lobsters to be harvested, a period that lasts about a month and half. Traditionally, people used this environmental cue to begin and end the harvest of lobsters, allowing the populations to recover during the remainder of the year. “Elders have observed that abandonment of this practice has led to overharvesting of lobster populations on Aneityum, and the depletion of this important food source,” the scientists write.

This change of practice is one example of how traditional knowledge of calendar plants is eroding, a trend that the researchers cite as troubling, asserting that it is critical that such information is recorded and revitalized before Indigenous knowledge systems decline even further. As part of their interviews with community members, the researchers sometimes made audio and video recordings that have been used to create a series of “[Talking Dictionaries](#)” that help to preserve names, pronunciations, and uses of plants, fish, birds, and other animals.

The research team’s calendar plants inventory is part of NYBG’s *Plants and People of Vanuatu* multidisciplinary project, co-led by Drs. Plunkett and Balick along with a diverse group of plant scientists, ethnobotanists, mycologists, cultural specialists, and linguists, including staff at the Vanuatu Department of Forests and Vanuatu Cultural Center. The project is part of the effort by NYBG’s International Plant Science Center to study and preserve plants, fungi, ethnobotanical and ethnomedical knowledge, cultural practices, and plant-related language information in many regions of the world. That includes poorly studied nations such as Vanuatu, which is not only a hotspot of biodiversity but also the most linguistically dense country in the world, with an estimated 138 languages spoken by a population of 319,000.

In an earlier research paper, a *Plants and People of Vanuatu* team documented how residents of two islands in Tafea province used plants in centuries-old “weather magic” rituals and other practices intended to understand and even influence the weather. A press release about that study is available [here](#).

In addition to The New York Botanical Garden and the Vanuatu Department of Forests, the calendar plant research was supported by the U.S. National Science Foundation (Grants DEB 1555657, 1555675, and 1555793), Velux Stiftung (Grant 1288), the Marisla Foundation, the National Geographic Society, the Christensen Fund, the Gildea Foundation, and the Silicon Valley Community Trust.

“Calendar Plants in Southern Vanuatu” is available at the following link:
<https://doi.org/10.1007/s12231-023-09575-w>

###

The New York Botanical Garden is a museum of plants, an educational institution, and a scientific research organization. Founded in 1891, the Botanical Garden is one of the world's preeminent centers for studying plants at all levels, from the whole organism down to its DNA. Garden scientists conduct fundamental research on plants and fungi globally, as well as on the many relationships between plants and people. A National Historic Landmark, the Garden's 250-acre site is one of the greatest botanical gardens in the world and the largest in any city in the United States, distinguished by the beauty of its diverse landscape and extensive collections and gardens, as well as by the scope and excellence of its programs in horticulture, education, and plant research and conservation. Learn more: nybg.org

The New York Botanical Garden, 2900 Southern Boulevard, Bronx, New York 10458

The New York Botanical Garden is located on property owned in full by the City of New York, and its operation is made possible in part by public funds provided through the New York City Department of Cultural Affairs. A portion of the Garden's general operating funds is provided by The New York City Council and The New York State Office of Parks, Recreation and Historic Preservation. The Bronx Borough President and Bronx elected representatives in the City Council and State Legislature provide leadership funding.

Media Contact: Stevenson Swanson at 718.817.8512 or sswanson@nybg.org