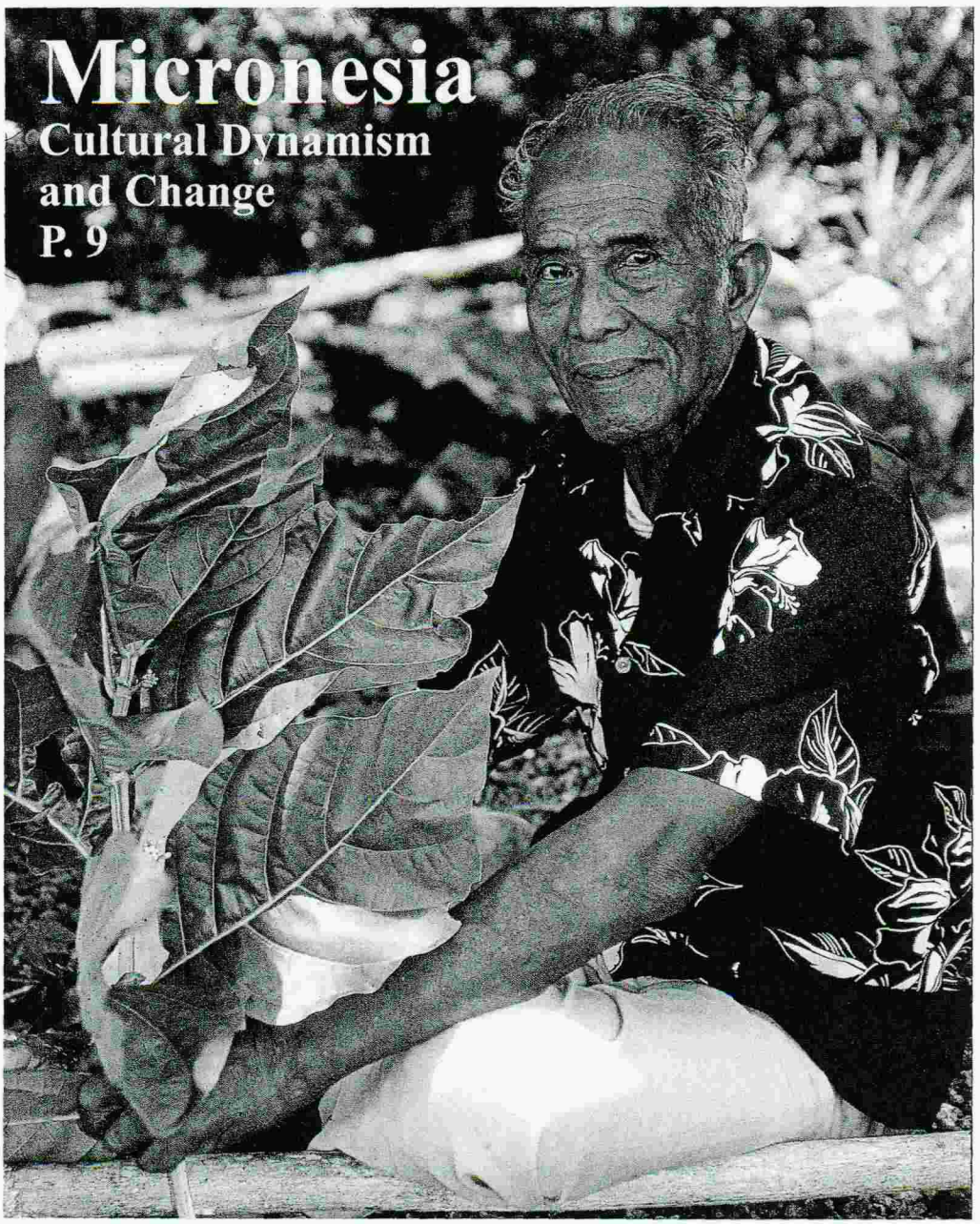
Economic Botany

Vol. 55 No. 1
January–March 2001

Devoted to Past, Present, and Future Uses of Plants by People



Published for
The Society for Economic Botany by
The New York Botanical Garden Press
Issued 19 April 2001

Inside . . .

Collections Corner: *Jesuits' Bark and Other Medicines, P. 3*
Plant Portraits: *Parasitic Plants Pummel Pavement, P. 7*

SPECIAL REPORT

CULTURAL DYNAMISM AND CHANGE— AN EXAMPLE FROM THE FEDERATED STATES OF MICRONESIA

The Federated States of Micronesia (FSM) is located in the Western Pacific, south of Guam and the Northern Marianas Islands, east of the Philippines and Palau, and north of New Guinea and the Solomon Islands. The FSM consists of about 60 inhabited islands and numerous uninhabited atolls stretching approximately between 137° and 163° degrees East longitude and between 11° and 1° degrees North latitude. There are four states in the FSM: Chuuk, Kosrae, Pohnpei, and Yap, with a total population of about 105 000 people living on approximately 700 square kilometers of land. In 1986 the islands officially became the Federated States of Micronesia when the United Nations Security Council dissolved the United States Trust Territory of the Pacific Islands. The grouping of these very different islands has created a country with impressive diversity in culture, language, geology, and ecology (Hinz 1993:251–253, 279–310; Ridgell 1994:67–68, 84–91).

The Micronesia Ethnobotany Project was initiated in 1997, as a collaborative study by institutions in both the United States and Micronesia. In initial conversations with individuals from many sectors, opinions were unanimous that many aspects of Micronesian culture—including music and dance, construction and craft skills, agriculture and language—are being lost at rates both significant and tragic. Leaders of the community, at both governmental and traditional levels, were particularly concerned. They told us they felt that the youth of today, as exposed as they are to Western culture and values, are abandoning the traditions of their ancestors in favor of taking on skills considered more useful in the modern age of computers, automobiles and electronics.

The set of what could be called "traditional knowledge" is and has always been dynamic for any given culture and is not always an easy thing to measure or describe. People often change the way they do things when new or easier methods of living become available.

In Micronesia, new species and varieties of plants have been traded between islands since early settlement. *Alocasia macrorrhiza* (L.) G. Don [Araceae] is a species of taro, a traditional starchy staple of Micronesia and much of the Pacific. At one time, *A. macrorrhiza* was consumed widely in Micronesia, but it has been gradually replaced by taro species in the Araceae that are considered more palatable, especially *Colocasia esculenta* Schott but also *Cyrtosperma chamissonis* (Schott) Merr. (Glassman 1952:13; Merlin et al. 1992:48). Before Europeans ever came to Micronesia, it is probable that several varieties of *Alocasia macrorrhiza,* and the cultural knowledge associated with them, became extinct.

The traditional leaders we spoke with in Micronesia were concerned with a related, but qualitatively and quantitatively different phenomenon. Instead of their culture changing and evolving at a relatively slow "background" rate, over the last two generations a large percentage of traditions and skills specific to Micronesia have not been passed on, and will become extinct if an active program is not put into place to keep them an active part of local life.

This loss of tradition is analogous to the loss of species biodiversity that is of great concern to many scientists today. Species extinctions and the evolution of new species have always occurred. Biodiversity loss in contemporary times has alarmed researchers not because of its existence, but because of its high rate—a rate many times higher than found in natural processes (Wilson 1988:10–13).

As part of the Micronesia Ethnobotany Project, we offer an annual course in ethnobotanical techniques at the College of Micronesia, Pohnpei branch. The course includes six hours of laboratory and field instruction in ethnobotanical history, interviewing techniques, plant collection, and preparation of specimens for the herbarium. During the 1999 course, we carried out an informal survey amongst our students. It involved a simple show of hands in answer to three questions: how many students remembered seeing their grandparents make traditional canoes, how many remembered seeing their parents make canoes; and, finally, how many of the students, themselves, had ever made a canoe?

Economic Botany 55(1) pp. 9–13. 2001

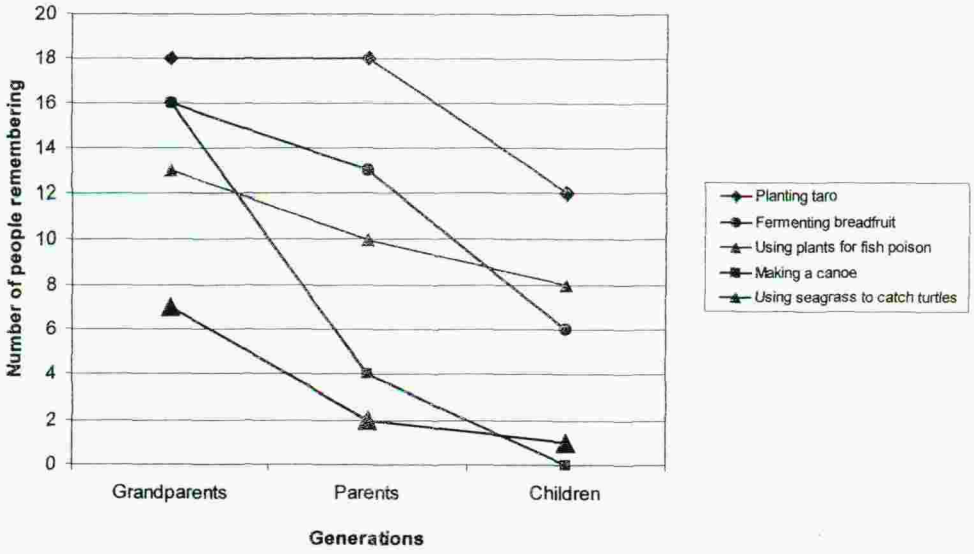


Fig. 1. Erosion of traditional knowledge.

What was striking was that, for this culture that once depended so heavily on the oceangoing canoes they produced, none of the young people in our course knew how to make a canoe—this skill appeared to be headed toward extinction.

During the 2000 course, we formalized the survey into a series of questions about generational knowledge involving several aspects of Micronesian life—planting taro (*Colocasia esculenta* Schott.); use of *Derris elliptica* Benth. as a fish poison; fermenting breadfruit (*Artocarpus altilis* (Parkins) Fosb.) in pits to secure its preservation throughout the year; the use of marine plants as bait to catch sea turtles for consumption; and the construction of outrigger canoes. The class of twenty students were in their late teens and early twenties, and came from all of the states of Micronesia–Pohnpei, Kosrae, Yap, and Chuuk. The results of this survey show that some traditional Micronesian skills are being preserved, while others are being lost rapidly.

Figure 1 displays curves representing retention of knowledge—all have declined over the past three generations, some more steeply than others. The sharpest decline by far is in the case of canoe making: interestingly, most of the decline occurred between the older generations of grandparents and parents, indicating that the parents of our students were already turning their sights to an existence not based on traditional skills. And of the sixteen students in this class who had been exposed to canoe making in their youth by their grandparents, not a single one knows how to make a canoe today. Of the five traditional skills measured, our students were personally familiar with four of them: planting taro (12 of 20), using fish poison (8 of 20), fermenting breadfruit (6 of 20), and using marine plants to catch sea turtles (1 of 20).

In some cultural contexts, certain skill sets such as complex knowledge of medicinal plants are fully developed only over a lifetime. Skills like these might generate the downward-sloping trend shown on our graph even in the absence of any cultural losses of knowledge. This is not the case in our study, where the college students in our ethnobotany course, who range in age from 18 to 24 years, represented the third generation. People of this age would definitely be considered adults in traditional Micronesian culture, and would have considerable experience in many, if not most, of the skills that we queried. The downward-sloping trends in our graph exist because the skills have not been passed on, not because the people in the younger generations have not had sufficient time to learn them.

We noticed three important properties of the graph: the rate of knowledge loss, the rank and numerical value of skills within generations (i.e., the actual *number* of people remembering), and the shape of the curves. The rate of loss is the clearest of these properties; it is easy to see that canoe-making knowledge is being lost faster

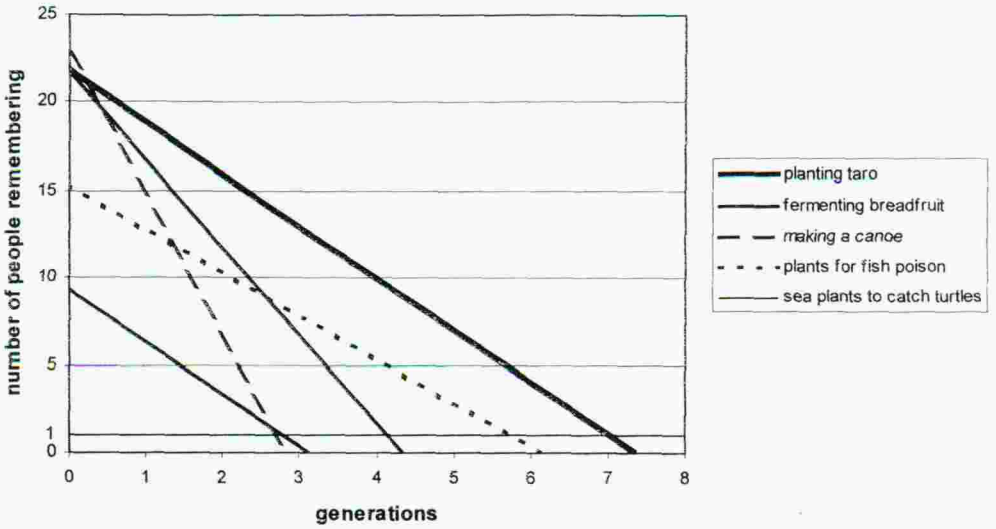


Fig. 2. Linear regression, erosion of traditional knowledge.

than knowledge of fish-poisoning plants. Many things affect rate of loss, but an obviously important factor is the complexity of the skill in question. Canoe making involves numerous separate steps, skills, and materials; its rate of loss has been very steep. Poisoning fish with the roots of a single plant species is clearly simpler and thus easier to transmit from generation to generation, and its rate of loss is the slowest of the five skills we queried.

The shape of each curve contains information about the changes between generations. The curves for canoe building, turtle catching, and fish poisoning show that knowledge of these skills declined more between grandparents and parents than between parents and children. For fermenting breadfruit and planting taro, however, knowledge has eroded more quickly between the second and third generations than between the first and second. It is interesting to note that these are the only two agricultural skills of the five. In this age of cheaper, more readily available imported food, agricultural skills are possibly being lost faster than they were a generation ago.

The rank and numerical value of activities within generations also show important trends. For example, while the *rate* of knowledge erosion is slow for traditional methods of catching sea turtles, its *rank* among other skills was lowest in both the grandparent and parent generations, and only one surveyed member of the present generation still retains knowledge of this skill. Thus, while the rate of loss is slow, traditional turtle-catching techniques are still in danger of imminently being lost because of the low total number of people that know this skill.

To analyze trends in the data, we ran a linear regression for each set of traditional knowledge (Fig. 2). With the help of these regression lines, we can make very tentative predictions about when each skill might become culturally extinct. If the present trends that shaped these regression lines continue, canoe building and turtle catching would disappear in this generation, breadfruit fermentation would survive only one more generation, fish poisoning would last two more and taro production four more generations. However, it must be stressed that the main value in the regression lies not in absolute predictions of cultural extinctions, but instead in pointing out which sets of traditional knowledge are in imminent danger of being lost.

Table 1 summarizes for each traditional knowledge set the total change in number of individuals knowing a particular skill, the generational rate of loss, the predicted generation of skill extinction, and the R^2 value of the linear regression.

In interpreting our data, it must be emphasized that our sample size consists of 20 people from the youngest generation and that we have data on only three generations. Therefore, while we can point out interesting trends in the data,

TABLE 1. CULTURAL DYNAMISM AND CHANGE IN MICRONESIA AND ITS RELATIONSHIP TO THE LOSS OF TRADITIONAL KNOWLEDGE.

	Total loss, grandparents to children (in number of individuals knowing skill)	Generational rate of loss (number of people losing skill per generation)	Final generation predicted to retain skill (from regression)	R^2 of linear regression
Canoe making	16	8	2	.92
Fermenting breadfruit	10	5	4	.95
Planting taro	6	3	7	.75
Turtle catching	6	3	2	.87
Using fish poisons	5	2.5	5	.99

its predictions must be regarded with caution, particularly those from the regressions.

Additionally, the sample is somewhat biased, comprising young adults that have been sent from their islands to be trained as the next generation of leaders, government officials and business people. Perhaps we would have gotten different results if we had used a larger, more representative sample, including young people from remote villages on different islands who were destined to continue working on their family's agroforestry plots and farms rather than to leave home and go on to college.

However, a recent example from Kosrae serves to support the notion that important traditional information and skills are being lost among all youth, not just those attending college. As part of an annual celebration, canoes are made in each municipality by crews that participate in a national race. Recently, in one municipality, there was no one in the crew that could construct a canoe, so a group from another municipality was hired to do the task. Elders in the first community pointed out that the traditional canoes characteristic of that community differed significantly from the one being built by the construction crew. They then offered to build the canoe in their traditional way, with its unique style. Although the race itself inspired great interest, it is said that not one young person was interested in learning the construction of what was possibly the last traditional canoe in the municipality.

During the ethnobotany course, discussion of botanical terminology in the local languages of Micronesia often revealed a loss of vocabulary in some of the local languages. In some instances, a student was aware of the existence of a word for a particular plant or plant part, but did not know the word. In other instances, a student did not realize that their own language even had a word for a particular plant or plant part until another student produced the word. As a result, the students realized, some for the first time, that their language is deteriorating—a fact that has serious implications for their culture.

Given the interesting results and implications of this small survey, we are in the process of implementing another larger survey about generational changes in the retention of traditional Micronesian skills. This larger survey will contain more specific questions that will address some of the factors we could not account for in this study. These factors include, among others, differences in the mechanisms for passing cultural skills between islands and the gender specificity of tasks. On Kosrae, for example, both genders plant taro, though the activity has a strong cultural significance for men: a boy becomes a man when he has his own taro patch. Conversely, on Yap, women are primarily responsible for taro cultivation and pass this skill on to their daughters.

Our survey shows that the continuing erosion of cultural knowledge is common in Micronesia, as in many other places currently being influenced by Western culture and the global economy. Perhaps elementary, high school, and college curricula can be devised to address this issue: using creative approaches to give value to traditional knowledge and skills may help to stem their loss. Unfortunately, unless the real significance of these losses is understood fully and soon, it will be too late to reverse the wave of cultural extinction sweeping through the world.

ACKNOWLEDGMENTS

We thank the students of the College of Micronesia–FSM, for their interest in the project as well as Christine Padoch for stimulating ideas

and discussion and Willa Capraro for her helpful suggestions on the manuscript. We would also like to thank the following organizations for the generous support that made this work possible: the Gildea Foundation, the Overbrook Foundation, the Metropolitan Life Foundation, Edward P. Bass and the Philecology Trust, the Prospect Hill Foundation, and CERC, the Consortium for Environmental Research and Conservation at Columbia University. We are grateful to the Pohnpei Council of Traditional Leaders for their interest in this project.

Literature Cited

Glassman, S. 1952. The flora of Ponape. Bernice P. Bishop Museum Bulletin 209. Honolulu, HI.

Hinz, E. R. 1993. Landfalls of paradise, 3rd edition. University of Hawaii Press. Honolulu, HI.

Merlin, M., D. Jano, W. Raynor, T. Keene, J. Juvik, and B. Sebastian. 1992. Tuhke en Pohnpei: plants of Pohnpei. East-West Center. Honolulu, HI.

Ridgell, R. 1995. Pacific nations and Territories: the islands of Micronesia, Melanesia, and Polynesia, 3rd edition revised. Bess Press, Inc. Honolulu, HI.

Wilson, E. O. 1988. The current state of biodiversity. Pages 3–18 *in* E. O. Wilson and F. M. Peter, eds., Biodiversity. National Academy Press, Washington, D.C.

—Roberta Anne Lee, Beth Israel Medical Center, The Continuum Center for Health and Healing, 245 Fifth Avenue at 28th Street, New York NY 10016; Michael J. Balick, Institute of Economic Botany, The New York Botanical Garden, Bronx, NY 10458; Dana Lee Ling, College of Micronesia–FSM, P.O. Box 159, Kolonia, Pohnpei FSM 96941; Francisco Sohl, P.O. Box 1346, Kolonia, Pohnpei, FSM 96941; Berry J. Brosi, Institute of Economic Botany, The New York Botanical Garden, Bronx, NY 10458; and William Raynor, The Nature Conservancy Pohnpei Field Office, P.O. Box 216 Kolonia, Pohnpei FSM 96941.