

The Society for



ECONOMIC BOTANY, INC.

DEDICATED TO THE PAST, PRESENT AND FUTURE USES OF PLANTS BY PEOPLE

## 2006 Schultes Award Report - Anthony Amend

### Management Effects, Population Biology and Indigenous Knowledge of *Tricholoma matsutake* in NW Yunnan, China

Botany Department, University of Hawai'i at Mānoa

Diqing, a predominantly Tibetan prefecture in NW Yunnan, is a stunningly beautiful biodiversity hotspot. This part of Yunnan Province contains roughly one-fifth of the nation's vascular plant species, one-fourth of the nation's species of mammals and one-third of its bird species. It also contains the UNESCO Three Parallel Rivers World Heritage Site so named for the deep gorges through which flow Asia's principal waterways: the Yangtze, Mekong and Salween rivers, which converge within 84 kilometers of each other before emptying into three separate oceans. Mushroom exports have largely filled the economic vacuum left when commercial logging was banned here, and Diqing is now China's largest exporter of *Tricholoma matsutake*, a luxury and medicinal mushroom prized in Japan. Despite Matsutake collection's relative novelty in S.W. China, the mushroom's impacts on local communities and on the environment have been marked. Today an estimated 60% of Diqing's economy revolves around the trade. This study seeks to understand the intricacies of how humans and fungal ecology interact by examining the reproductive biology of Matsutake within a human-disturbance chronosequence, assessing gene flow within the prefecture, and comparing indigenous knowledge with extant Matsutake management strategies.

With help from the Shangri-la Alpine Botanical Garden, Matsutake habitats were surveyed using a plotless method, and all plant vouchers were deposited in SABG's herbarium, Zhongdian, PRC. Mushrooms and mycorrhizas from seventeen sites throughout the prefecture were collected, and vouchers were deposited in the Kunming Institute of Botany (KIB) herbarium, Kunming, PRC. These collections were used to construct a set of polymorphic microsatellite DNA markers to be used in subsequent genotyping and population structure analyses. DNA sequences from microsatellite construction will be submitted to the GenBank online database. Preliminary data shows genotypic diversity at surprisingly small geographic scales (i.e. within a single soil core), setting a new paradigm for our understanding of Matsutake populations and potentially affecting management implications for preserving local genetic diversity.

To assess Matsutake information pathways, questionnaires were completed by harvesters, Matsutake dealers, government officials and non-governmental conservation professionals. Harvesters ranked who they consider most trusted sources for information about Matsutake. Consensus analysis of rankings supports the conclusion that there is strong agreement among harvesters regardless of co-variables, and that village leaders and government officials appear to be the overwhelmingly preferred information sources. Likewise, questionnaires from mushroom businessmen, government officials, and non-governmental conservation professionals showed strong consensus and realistic anticipation of harvester response.

The long-term economic potential provided by Matsutake collection may be among the strongest incentive Diqing communities have for conserving some of the most biodiverse temperate habitats on earth. By understanding the basic processes constraining Matsutake recruitment and growth we can begin to understand how human activity affects these parameters. By understanding local information pathways, we can optimize how that information disseminates to various stakeholder strata, ultimately bringing Matsutake collection closer to economic and ecological sustainability. Many thanks to the Society for Economic Botany for supporting this work.

SEB Business Office, PO Box 61788, Honolulu, Hawai'i 96839 USA | [SEB@econbot.org](mailto:SEB@econbot.org)  
SEB is a 501 c(3) non-profit organization registered in the state of NY.

The Society for Economic Botany (SEB) was established in 1959 to foster and encourage scientific research, education, and related activities on the past, present, and future uses of plants, and the relationship between plants and people, and to make the results of such research available to the scientific community and the general public through meetings and publications.