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Preface

The Q'eqchi' Maya of Belize have an extensive ethnopharmacopoeia of medicinal plants used traditionally for reproductive health and fertility. Ethnobotanical research was carried out in the Q'eqchi' communities of the Toledo District of Southern Belize from 2007–2011 on medicinal plant species used for reproductive health. Data was gathered primarily through semistructured interviews and plant collecting trips with 6 traditional healers, 3 midwives, and 12 female herbalists. The Belizean Q'eqchi' are utilizing more than 60 plant species for reproductive health treatments, with the most species from the black pepper family, Piperaceae.

Ten species were selected for investigation of their estrogenic activity using a reporter gene assay: *Clidemia crenulata* Gleason, *Drymonia serrulata* Jacq. (Mart.), *Gouania lupuloides* (L.) Urb., *Miconia oinochrophylla* Donn. Sm., *Mimosa pudica* L., *Piper jacquemontianum* Kunth, *Piper peltatum* L., *Psychotria acuminata* Benth., *Psychotria poeppigiana* Müll. Arg., and *Tococa guianensis* Aubl. These plants are used to treat female infertility, male infertility, menopausal symptoms, heavy menstruation, uterine fibroids, *k'uub'sa'* (a Q'eqchi' womb disorder), for miscarriage prevention, for use as female contraception, and for male contraception. Methanol extracts of the leaves of all species were assayed, as well as the stems of *G. lupuloides*, roots of *M. pudica*, and the roots of *P. peltatum*. All the extracts displayed estrogenic activity, except for *M. pudica* roots and *P. jacquemontianum* leaves, which were both cytotoxic to the MCF-7 breast cancer cell line. Nine of the species assayed were estrogenic, four of the species were also antiestrogenic, and two of the extracts were cytotoxic to the MCF-7 cell line.

Women's healing traditions are being lost in the Q'eqchi' communities of Belize at an accelerated rate, due to a combination of factors including: migration from Guatemala disrupting traditional familial lines of knowledge transmission; perceived disapproval by local biomedical authorities; women's limited mobility due to domestic obligations; and lack of confidence stemming from the devaluation of women's traditional knowledge. Medicinal plant knowledge is highly gendered with women and men commonly using different species in reproductive health treatments. Revitalizing women's healing practices is vital for maintaining the traditional knowledge needed to provide comprehensive healthcare for Belize's most remote indigenous communities.

Jillian De Gezelle

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Thank you to the other traditional healers of the Q'eqchi' Healers Association, Don Manuel Baqui, Don Emilio Cal, Don Lorenzo Choc, Don Manuel Choc, and Don Domingo Pop. I would also like to thank the following people for their contribution to the ethnomedical research, Ms. Dominga Ack, Ms. Francisca Ack, Ms. Adelina Ash, Ms. Bartola Avilez, Ms. Anita Caal Coc, Ms. Louisa Chiac Pacham, Ms. Juana Chub, Ms. Manuela Cus, Ms. Rosefina Cus, Don Juan Cus Coc, Ms. Jesus Ico, Ms. Diana Lara, Mr. Eduardo Lara, Ms. Eugenia Lara, Ms. Dolores Oh, Ms. Petrona Pan, Ms. Marcelina Te, and Ms. Laticia Zuniga.

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Chapter 1
Introduction

1.1 Ethnobotany and Ethnomedicine

The relationship between plants and people has its origins in the beginning of our coexistence and has evolved into a remarkable diversity of manifestations. Plants now have an essential role in such diverse areas of our lives as agriculture, medicine, religion, construction, textiles, the visual arts, and music. The multidisciplinary study of the relationship between people and plants is known as ethnobotany. This includes medical ethnobotany, the study of the use of medicinal plants by people for healing. Medicinal plant use cannot be comprehensively studied or fully understood without the complementary investigation of the culture of the traditional medical system. The study of a culture's traditional medical practices is known as ethnomedicine, and includes beliefs on health and disease, diagnostics, health-related practices, and all aspects of medical treatments. My research unites the disciplines of medical ethnobotany and ethnomedicine to comprehensively study Q'eqchi' reproductive ethnomedicine with a focus on the medicinal plants utilized in this branch of traditional Maya medicine.

1.2 Purpose and Scope of Research

The purpose of my interdisciplinary research in Belize was threefold: first, to research and document practices and beliefs related to Q'eqchi' Maya reproductive ethnomedicine, with particular focus on traditional plant-based remedies related to reproductive health and fertility regulation; second, to assay extracts of a selection of the medicinal plants used in Q'eqchi' reproductive ethnomedicine for relevant bioactivity, as a means to further validate traditional Maya medicine and Maya traditional wisdom; and third, to investigate the causes and consequences of the significant decline in female practitioners of Q'eqchi' Maya traditional healing and midwifery in the indigenous communities of Belize.

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1.3 Research Questions

1. What ethnomedical treatments, including medicinal plant remedies are used for reproductive health in Q'eqchi' traditional medicine?
2. What bioactivity may account for the medicinal efficacy of plants used traditionally by the Q'eqchi' people of Belize for the treatment of reproductive health-related conditions?
3. Why is there a decline in traditional female healers and midwives in the Q'eqchi' communities of southern Belize?

1.4 Hypotheses

1. Q'eqchi' traditional medicine has an extensive ethnopharmacopoeia of medicinal plant species used for reproductive health, as well as culturally specific ethnomedical practices.
2. Traditional Q'eqchi' medicine treats conditions related to hormone imbalances with plants containing compounds whose bioactivity can be demonstrated in standard hormone bioassays.
3. Women's healing traditions are being lost in the Q'eqchi' communities of southern Belize due to a combination of factors related to their emigration from Guatemala and the sociocultural setting of Belize.

1.5 Background

1.5.1 Natural and Cultural History of Study Site

Belize

Belize is a small Caribbean nation located in Central America, bordered by Mexico to the north and Guatemala to the south and west. The eastern edge of Belize meets the Caribbean Sea. Belize has the second-longest barrier reef in the world, and the longest in the northern hemisphere, extending 220 km, with 79 % of the Mesoamerican Reef System in its territorial waters (Hartshorn et al. 1984; Jacobs and Castañeda 1998). Belize is comprised of 22,963 km^2 of land area that includes 689 km^2 on 450 cayes off of its shores (Hartshorn et al. 1984). Precipitation in Belize varies from a 4-month dry season with less than 1300 mm of rain per year in the north, to a shorter dry season in the south with over 4000 mm of rain per year creating a range of ecological niches, in a gradient from north to south getting increasingly wet. This small country is home to 576 species of birds, 288 species of Lepidoptera, 163 species of mammals, and 122 species of reptiles (Jacobs and Castañeda 1998). Seventy

percent of the country is estimated to still be under forest cover today, though up until the early 1980s 93 % of the country was classified as "forest land" (Balick and O'Brien 2004).

An anomaly among the Spanish-speaking countries in Central America, Belize was once a British colony (then known as British Honduras), and English is the official language. An English Creole—Kriol—is the language spoken ubiquitously and the culture has a strong Caribbean influence and association. It is at once Central American, Caribbean, and most significantly,uniquely Belizean. Belize is ethnically very diverse, with a population comprised of Kriol (Creole), Garinagu (Garifuna people), Q'eqchi' Maya (Kekchi), Mopan Maya, Yucatec Maya, East Indians, Mestizos, Mennonites, Taiwanese, Chinese, Lebanese, American and European expatriates, and others. The country has the lowest population density of all the Central American countries, and few major roads. Thus, the country has maintained much of its natural habitat and the biological diversity it holds.

The Belize Ethnobotany Project began in 1988, which was the largest ethnobotanical and floristic inventory ever undertaken of this country. Central to the project was an extensive survey of ethnomedical practices and beliefs, and medicinal plant knowledge. This project also produced and published the *Checklist of the Vascular Plants of Belize* (Balick et al. 2000). The scientific team documented 3408 species of vascular plants, 1219 genera, and 209 families known to the country. *Schippia*, a monotypic genus along with 41 other species are endemic to Belize, comprising 1.2 % of the native and naturalized flora of the country. Of the total flora, including cultivated taxa, 38 % were found to be considered useful. In a country of such cultural and biological diversity, knowledge of useful and medicinal plants is a common thread running across cultures and is a part of the collective Belizean national heritage.

Toledo District

Belize has six districts, with the Toledo District being the southernmost. Punta Gorda (locally called "P.G.") is the district town for Toledo, and has a population of around 5000 people. P.G. has bus service out to the 30 or so villages in the Toledo District, which has a population total of ca 30,000 (Statistical Institute of Belize 2011). Toledo is the most remote district; Punta Gorda is a coastal town (Fig. 1.1) located at the end of the Southern Highway and is approximately 7 h by local bus from Belize City.

Toledo has the largest indigenous population in the country, and the majority of Q'eqchi' Maya, Mopan Maya, and Garifuna people living in Belize reside in this southernmost district. Toledo has the lowest population density, the largest average household size, and the least access to electricity and public water in the country, as well as many other indicators of disadvantage among the Belizean population. Furthermore, Toledo has the greatest disparity between males and females with regard to education levels and employment rates (Statistical Institute of Belize 2007). Q'eqchi' women I spoke with during my research often said their biggest struggle