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ETHNOBOTANY
& DAI MEDICINE:
HERBAL ROOTS

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SIT: Study Abroad

China: Health, Environment and Traditional Chinese Medicine. Kunming

Fall 2019

ABSTRACT

Xishuangbanna is home to one of the most biologically and culturally diverse regions in China. Dai medicine from the Dai people has been recognized by China as one of the four major ethnic minority medicines. With over 2,500 years of practice, Dai medicine utilizes the herbs found in the diverse region mixed with principles and theories from Buddhism. There have been over 500 unique herbs used in Dai medicine, each with different properties and functions. As Xishuangbanna continues to develop as a city and expand its rubber and banana plantations, it has large impacts on the environment, living standard, education, and culture, overall, changing traditional Dai medicine and herbal collection. The records and experiences living in different Dai villages learning about herbalism are focused in this paper, documenting the traditional knowledge as well as noting the changing methods, limitations and lack thereof, and impacts development of the region has on Dai herbal medicine.

Keywords: Anthropology, Botany, Environmental Studies, History, Ecology, Traditional Healing

ACKNOWLEDGMENTS

This report was conducted through the SIT China: Health, Environment, and Traditional Chinese Medicine study abroad program in Kunming with the help of many caring individuals. Thank you, Lu Yuan, for being an amazing program director and providing assistance and guidance throughout the project.

Thank you, Francis Commercon, for introducing me to the local people and the herbalist in the Man E Village region. Thank you for your advice and guidance as well as providing such amazing opportunities.

Thank you, Michael/Fu Tao and Julia/Liu Shuang for sharing with me the wisdom, diversity, and culture of Xishuangbanna. Thank you for introducing me to tea culture and the hidden gems of the region.

Thank you, Mi Xiang Han, for teaching me your knowledge, patience, and kindness in Dai herbalism. Thank you so for taking me in and looking after me.

Thank you, Dao Jun Wen, for translating and welcoming me to learn about Dai medicine. Thank you for the Dai Herbal Medicine book.

Thank you to all the other SIT students for their support and keen interest, especially Audrey Cabay and Ashely Turner.

Thank you to all these amazing and wonderful people. This project could not have been done without them

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INTRODUCTION

Xishuangbanna

The Autonomous Dai Prefecture region of Xishuangbanna is located in China's most southwestern part of the Yunnan Province. It shares borders with Myanmar, Laos, and the Mekong River runs through to Thailand. The climate in this region is monsoon tropical, though Xishuangbanna is at the northern extremity of tropical climates so it is not always as consistently warm as other tropical regions. Most of the land is steep and mountainous.

The prefecture is divided into three counties: Menghai County, Jinghong County, and Mengla County where the capital lies in Jinghong City in Jinghong County.

Xishuangbanna is one of China's most culturally diverse regions. With a population a little over 1 million, Xishuangbanna is populated by thirteen distinct ethnic minority groups, including the Dai, Hani, Bulang, Lahu, Yi, Yao, Jinuo. Dai people are the most prominent ethnic group in Xishuangbanna, followed by Han and Hani. These three groups altogether comprise 71% of the population, where the rest of the 29% is of the other ethnic minority groups (Hammond et al., 2015).

Aside from being one of the most culturally diverse regions in China, Xishuangbanna is also the most biodiverse region within China. Though it only covers 0.2% of China's land area, it harbors about 10% of fish species, 15% of amphibians and reptiles, 16% of plants, 22% of mammals, 36% of avian species found in China (Hammond et al., 2015). It is also the only place in China to be able to find iconic animals such as wild elephants and gibbons. The ethnic minority groups within this region have maintained Xishuangbanna's biodiversity through thousands of years of traditional land-use practices. Local people have long traditions of integrating secondary successional vegetation within their agroforestry systems with the diversity of native ecosystems. These agroecosystems have a large impact on providing wildlife habitat, nutrient cycling, and contribution to strong biodiversity (Xu et al., 2014).

However, this is all changing as new industries begin to develop within the region. Even though 12.6% of Xishuangbanna's land is designated as protected area by the government, tropical forests continue to be converted for development or plantation (Li et al., 2007).

As China continues to industrialize, and people's standard of living continues to increase, biodiversity continues to decline within Xishuangbanna. Aside from traditional tea farming with ancient tea trees, the minority groups find better economic opportunities in farming rubber and banana trees as an alternative to traditional land-use practices. Rubber plantations dominate land use and the economy in Xishuangbanna. Of the 19,700 km² area of Xishuangbanna, about 21% or 4,150 km² is purely rubber plantation. Though mountains may look like dense lush forests, much of it is monoculture rubber trees planted in straight lines, threatening local biodiversity. Forest cover has been reported to have decreased from 63% to 34% within the last few decades (Xu et al., 2005).

This new industry has impacted not only the land but also the culture and livelihood of locals. Since tea and rubber demands have increased, so have household income. It has become so profitable that there is an increased lack of motivation for higher education. The region faces high dropout rates in education, excessive drug consumption, and gambling.

The region of Xishuangbanna is changing rapidly. As development continues, it is important to preserve local knowledge and culture, as well as protecting the environment.

THE DAI

History

The ancestors of the present Dai ethnic minority group were formed as a semi-uniformed political organization during the Qin and Han Dynasty periods at around BCE 221. The first Dai prefecture was set up under Emperor Wu Di at BCE 109 as the Yi Zhou prefecture, literally meaning Yue people's state, in southwestern China. Yue people being a subgroup of the separated Dai kingdoms early on. During this period, the Dai sent emissaries bearing tribute to the Chinese emperor as appreciation for their official recognition in the Han Dynasty. The emissaries brought great praise to the Dai people from the Han court through their musical and acrobatic performances. The emperor gave the ambassadors gold seals for their excellence and gave their leader the title of "Great Captain". During those years, the Dai people would officially be affiliated with the Han dynasty, receiving recognition and protection.

During the 8th to 11th centuries, the Dai people further split up into smaller tribes and ruled semi-autonomously. However, during the 12th century, a Dai chieftain named Pa Ya Zhen unified all the local tribes and established a local kingdom where the capital of the kingdom was located in present-day Jinghong. Though, this kingdom was still within the confines of Imperial China.

The Dai homelands were unified into the Yunnan Province during the Yuan Dynasty (CE 1271-1368). The same feudal system was in place through the Ming (CE 1368-1644) and Qing (1644-1911) Dynasties. However, under the fall of the Qing Dynasty, the new republic was placed under the rule of the Kuomintang. After the rule of the Kuomintang, the Dai people were granted autonomous administration under the People's Republic of China around 1954.

Culture

Dai is a blanket name for many different, but similar cultures of the same origins. It is often used to represent the Tai Yai, Shan, Lue, Tai Dam, Tai, Baiyu, and many other names. Aside from living in China, the Dai can also be found in Myanmar, Laos, and northern Thailand. There are roughly 8 million Dai people, where Myanmar has the largest population of around 6.5 million, followed by China with 1.1 million.

The majority of Dai people follow Theravada Buddhism, which plays a large role in their beliefs, identity, and culture. Before Theravada Buddhism was introduced to the Dai, local folklore and animism were practiced. Now, every village has at least one temple. Traditionally, all boys have to go through the temple to receive education in Dai written language and the principles of Buddhism. Monastic life is a part of their livelihood. Today, boys are not required to go to the temple anymore to pass into adulthood, though it is still highly encouraged. Modern changes in education and mainstream Han Chinese schools have lowered the rates at which boys attend the temple. Learning the written language was important in passing down knowledge, tradition, and stories. Traditional Buddhist scriptures were all written on special palm leaves made from Talipot Palm (*Corypha umbraculifera* Linn), written in ancient Dai. After simple processing, cutting, modifying, drying, and pressing, the leaves were then bound into volumes. They would then use iron pens to carve ancient Dai into it. They are very well preserved and durable.

Importantly, Buddhist temples were not only considered a place of religious practice but also as a medicinal center for the sick. Buddhist monks treated everyone equally, fairly, and cheaply. Buddhist monks and men that went to the temple when they were young, often learned and wrote down herbs, medicine, and healing rituals on the Talipot Palm paper. Today, a major source of knowledge still comes from these ancient scriptures. Modern Dai hospitals still translate them into modern Dai, Chinese, and English.

Medicine

Dai medicine has been practiced for over 2,500 years in Xishuangbanna and is one of the four major ethnic minority medicines in China, which includes, Tibetan, Mongolian, and Uigur medicines (Fauchet 2006). It is heavily associated with Theravada Buddhism, where herbs and Buddhist chants go hand in hand. Traditionally, all Dai doctors were male because of their association with the temple as well as the tradition of passing knowledge from father to son. Each Dai village would have their own doctor as the passage from village to village was difficult before roads were established. It also has its origins in collecting from the land, using herbs, bugs, fungi, and animal parts.

However, Dai medicine mainly revolves around herbs. Traditionally, to be a good Dai doctor, they have to be a good herbalist, be able to identify plants, and their uses. All medicine revolves around and comes from the land around. Xishuangbanna is a biodiversity hotspot with over 3336 native plant species (Zhu et al., 2006), having a plethora of unique herbs with different healing properties, making Dai medicine so powerful and effective.

Concepts and theories of Dai medicine developed from Buddhism, where both the body and the world are formed from four elements: wind, fire, earth, and water. A balance of these four elements is what keeps the body healthy.

There are also specialized Dai medicine doctors, particularly in bone fractures, bone injuries, and rheumatism due to the humidity of the region. Very advanced doctors use a special technique called “cui gu” in Chinese which directly translates to bone blowing. The doctor will chant special Buddhist words while blowing and rubbing the fractured area. To its mystical abilities, the bone will slowly mend and heal. To be able to do this, the doctor must be trained and reach a certain level. If one word is chanted incorrectly, there will be no effect.

A very large concept of health preservation in Dai culture is also prevention. Being active and eating a healthy balance of various foods is ingrained in Dai culture. Even today,

upwards of 70% of people in Xishuangbanna still live in rural areas where agriculture is the main source of income (Hammond et al., 2015), keeping up the active lifestyle. In many traditional Dai dishes, herbs are used to cook various soups and dishes. Herbs that not only act as a flavoring but also medicinally (such as lemongrass), are also used generously to flavor meats and insects. Today, people still enjoy a wide and healthy diet of foods that comes from the surrounding land.

Using plants and herbs are ingrained in their lifestyles. Traditionally, each family would possess an herbal first aid kit for minor injuries and sicknesses. Within these health kits were a grinding stone to create powder and various dried herbs to treat cuts and common colds.

Purpose

The purpose of this paper is to better understand the important role herbs play in Dai medicine and how herbal medicine is adapting or lack thereof to the quickly developing region of Xishuangbanna. This is done through learning about Dai culture and traditions as well as daily life and living styles. An herbarium was also collected and created, documenting thirty-six unique herb species.

METHODS

Interviews

Interviews were conducted and collected randomly with locals from Xishuangbanna. They were informal and asked basic questions on who they were, if they used Dai medicine, and to what extent did they use it. Everyone's identity was kept anonymous, names, age, and anything used to describe the people was not noted. There was a total of fifteen informal interviews conducted.

However, a total of four formal interviews were conducted on Dai doctors and herbalists. These were to get to know the doctors in more depth. Age, name, and background information was all gathered and written down. They all gave consent to use and share the information gathered from them.

Fieldwork

A total of three weeks was spent in Xishuangbanna gathering data. The first week was spent living in a little village right outside of Jinghong City named Manjing Han Village (曼景罕村). The second week was spent living in Man E Village (曼俄村) in Menglun, Mengla County. The last week was spent back in Jinghong City at the Dai hospital.

Herbarium

A total of thirty-six unique species were collected from the field, pressed, and mounted onto paper. All herbarium specimen was collected from the region of Xishuangbanna, more specifically in Jinghong and Mengla counties.

FIELDWORK

The Basics of Dai Herbalism

A wide variety of herbs are used in Dai medicine, ranging from trees to grass to flowers. There are three major categorizations of these herbs. *Mai* is the first, categorizing all the herbs that have tall, straight, and hard stems (trees); *he* the second, categorizing herbs with thin and flexible stems (vines); and *ya* the third, categorizing all herbaceous plants. (Hieng Phu 2005).

Herbs are also broken down into further categories of taste, helping identify their properties and uses.

For uses, the herbs have been tested for their medicinal properties over thousands of years. Experienced herbalists today may also identify and guess an unknown plant's medicinal properties by using their trained senses in taste, smell, and touch.

The harvesting of these herbs also depends on a variety of factors, including the season and environment. For example, the herbalist Mi Xiang Han said that usually, the best season to harvest herbs was during the winter or dry season. During this period, it rarely ever rains and helps preserve the herbs for longer storage that are harvested during that time. However, it also depends on what type of herb is desired. Sometimes the rain will allow certain herbs to absorb water and hydrate a particular area of the plant, giving it stronger attributes, for example, the saturation of roots may be desired. Many factors go into collecting herbs.

Manjing Han - First Village

There is a famous Dai doctor by the name of Kanglang Xiang (康郎香) who lives in the village of Manjing Han. In search of this doctor, the first week of fieldwork took place in Manjing Han. For the first week, Xiang was back in Jing Hong treating patients at the Dai Hospital, so he was unattainable. Another Dai doctor was met at the village, specializing in bone medicine. His name was Kanglang Long (康郎龍) and had been the fourth generation Dai doctor, with knowledge passed down from his father. He worked as a scribe for the little tourist industry running in the village, showing tourists the ancient tradition of writing on Talipot paper with ancient Dai. When he was six, he attended the temple for a couple of years, learning how to read and write in Ancient Dai. During his work, he translates ancient scriptures into modern Dai scriptures. When he is off work, he goes into the mountains to collect herbs, processes herbs, and prepare medicine for his patients.

At his house, he prepared an herbal mix of five special herbs, specifically noted to help with rheumatism and bone fractures. He mixed them all and chopped them into little pieces. After that, he placed all the minced herbs on a tarp to dry. This concoction was to be soaked in alcohol (40% alcohol concentration and above) and then directly applied to the surface of the bone fracture area. The solution would slowly soak to the bone and mend it or rid of the excess humidity.

It was not until the last day at the village until Xiang had come back to the village. There at his house, his granddaughter's husband, Dao Jun Wen (刀俊文) who also worked at the Dai hospital, translated from Dai to Chinese during the interview. Xiang is an eighty-two years old man who still treats patients daily. He is the 10th generation Dai doctor and started learning about Dai medicine in the temple at a young age. Before any of the roads were built between the villages, Xiang would trek miles and miles every day to far villages on both sides of the Mekong river, treating patients while expecting nothing in return. He did this for

many years, treating thousands of patients. He collected herbs in the mountain for a long time and knows how to identify the plants, how to use them, and where to find them. However, the recent rapid development of this region has changed the landscape greatly, especially around Manjing Han. The village is predominantly surrounded by rubber plantation. Every mountain top around the village was purely rubber tree. Today, because of age, Xiang does not go into the mountain to collect herbs anymore, rather he plants specific herbs in his neighbor's yards, collecting them whenever he needs to get them. It is also important to note that certain herbs are much rarer and difficult to find now. A lot of herbs have to be imported from neighboring counties or countries such as Laos, Myanmar, and Thailand.

Aside from working with the doctors, the village was a great introduction to understanding a bit of Dai culture. During the first night, there was a wedding of a newlywed couple. Everyone was openly welcomed to the wedding, where free food, drinks, and music was offered at what seemed like a limitless expense. They were very welcoming. In the middle of the week, a party and celebration of a newly built house were also happening, where the entire village was invited to attend and feast. The community is very strong within Dai culture, during any of these events, all the neighbors and friends would help cook, set up, and clean. Within all the meals, a plethora and variety of different herbs were cooked, ranging from pumpkin to greens. This was also the time of the Open-door festival which lasts for three months. This is the only time of year where weddings, house openings, and other events are allowed. Before any of these events, Dai men usually slaughter a cow at four to five in the morning to celebrate for the ceremony. They process all the meat by the afternoon where everyone feasts. The women handle all the herbs, vegetables, and other foods.

Man E – Second Village

Man E Cun is a village located in Menglun, Mengla county, right next to Xishuangbanna National Tropical Botanic Garden (XTBG). Located there was Mi Xiang Han's (咪香罕) herbalist clinic and home. Before becoming an herbalist, Mi was trained in western medicine, working as a nurse and helping many patients. However, she eventually started her own business as a cook and restaurant owner, cooking both Dai and Chinese food. After that, she decided to become an herbalist and help people heal with Dai medicine. Both her and her husband work to gather herbs, create dosages, and treat patients with a variety of health problems. Because women are not traditionally taught Dai medicine, she did not directly learn Dai medicine from her father, who was also a doctor and herbalist. She would learn by observing and helping her father collect herbs when she was younger. Today, Mi and her husband have developed a book of herbs that includes the Chinese name, Dai name, and Latin name of over 200 different herbs commonly used in the medicine they create. Each herb has its function, and taste included. However, it is difficult for non-experienced herbalists to use as it has no pictures, descriptions, or dosage information included for the herbs. It is a guide to help Mi remember the herbs.

From a day to day basis, four to five different patients would come to get herbal oil massage for various body problems or come to buy some herbal powder medicine. One of the principles of Dai medicine is that it heals holistically but slowly, it rids of the root problems. A lot of botanists and scientists from XTBG

Under Mi's help, an herbarium collection of thirty-five unique species were mainly collected, identified, and created here. She would harvest and show the uses of many herbs every day. Almost every morning, Mi and her husband would go to the market to buy vegetables and herbs for the day. Early every morning, there was a section of the market in Menglun that would sell herbs that were collected from the mountain. By noon, all the

mountain harvested produce was sold out, and the vendors would have left already. Since Mi used to be a chef, she cooked a lot of meals. She would always prepare a healthy balance of different vegetables, herbs, and eggs, explaining the properties of each herb and how they may help with balance or help with any health problems. For example, she would often cook the herb called *Chrysanthemum coronarium L.*, helping people who eat it with deeper better sleep.

She also showed so many different herbs grown in her yard. She used to grow and sell a lot of herbs to the Dai hospital in Jinghong, so she has a wide collection of fresh herbs. The collection has herbs that fight a wide range of diseases and serve many purposes, ranging from curing epilepsy, to fighting cancer and various poisons, to helping rid of odor. However, there are still many herbs that cannot be planted, where harvesting in the mountains is required.

During the last day at the Mi's house, her friends had invited her to walk around and collect some herbs on a large mountain where conservation and traditional land use were going hand in hand. There she collected a lot of herbs that could not be found in the villages. She had also noted locations of special herbs that she would potentially harvest later, allowing the herb to grow more, reproduce, or fruit. This land had very high biodiversity, where scorpions, cobras, and rare birds were encountered during the short time on the mountain. Her friends were using the land by planting, growing, and harvesting epiphytic orchids from trees. Trees were not allowed to be cut down and wild animals were not allowed to be hunted on this land.

Stories

During the time at Mi's house, she told many Dai stories and legends behind the finding of the uses of these herbs. Below will be a collection of a few stories told. They may not be the exact story as they were translated and told in Chinese.

The Five Treasures – Wu Bao 五寶

There was once a beautiful Dai woman whom everyone in the village loved. She became so ill with something the villagers had never encountered before. Everyone wanted to help, Dai doctors and herbalists gave her medicine, but to no effect was she recovering. One day, five brothers from a neighboring village all wanted to help, so they went into the forest and each collected their own herbs. Each thought their herb would help her recover. She took each of them separately and felt a little better each day. But then, the brothers decided to mix them and create a stronger herbal concoction. The combination of these five herbs healed her completely. Since then, they were known as the five treasured herbs.

When combined or used separately, these herbs have powerful healing properties. Each herb has a specialized and general function that will strengthen the body. These herbs have no trace of toxins or poisons, so dosage is not very important. Below are the Chinese and Latin names as well as their status.

Chinese	Latin	Status
馬蓮鞍	<i>Streptocaulon griffithii</i> Hook. F.	Common
箭根薯	<i>Tacca chantrieri</i> Andre.	Common
小天冬	<i>Asparagus meiocladus</i> Leul.	Common
羊耳菊	<i>Inula cappa</i> (Buch-Ham) DC.	Rare
酷冬瓜	Unknown	Extinct

Figure 1. Chinese and Latin names of the five treasured herbs. Rarity is given through status.

The Unknown Flowers and the Blind Man

There was once a famous Dai doctor that was collecting herbs in the nearby mountain. On his way to collect herbs, he passed a house with bright orange flowers he had never seen before. He was curious and wanted to collect some or buy them off whoever lived there. An old man appeared, and the Dai doctor asked if he could buy some of the flowers. The old man, never been asked a question like this, refused. He did not know what the flowers were and thought to himself, if somebody wanted to buy this plant, it must be rare or have some magical properties. The Dai doctor left disappointedly but respectfully. As time passed on, the old man slowly started to lose his vision, eventually becoming blind. Out of nowhere, the old man thought to himself to use the magical plant's seeds to steep tea. He drank this every day for a while and all of a sudden, his vision had come back. He was so happy, he had to find the doctor to tell him what this plant did. He eventually found the Dai doctor and gave him plenty of seeds.

This herb is called 决明 (jue ming) or *Cassia tora Linn.* Aside from using the seeds to steep tea for improvement of vision, its roots can be cooked and combined with other herbs to help treat epilepsy, headaches, and high blood pressure.

The Woman Who Cried

Near the Mekong, there was a beautiful Dai woman. All the men she encountered wanted to marry her for her unmatched beauty. However, one day, a detrimental skin disease had hit her. No doctor could understand or cure what disease she had gotten. They thought it was leprosy. People were so afraid of her and would not even talk to her and she was practically exiled. So, one day, she went into the field and started to weep. She cried so hard that she started to roll around on the ground, breaking plant stems and rolling in their latex. When she got up, she was covered in white plant latex and wondered what it was but did not

care. The next morning, she woke up, her skin was healed and back to normal. She was so shocked and happy but also so confused. She went back to the field and looked at the plants she was rolling in. From then on, they would use this herb to help skin problems.

This herb is called 飛揚草 (fei yang cao) or *Euphorbia hirta*. Its white latex is known for its skin healing abilities for scars, bug bites, burns, and acne. It is often cooked with water and sulfur to create a solution to take baths in.

These stories are all traditional tales, telling the origins of certain herbs, passing down knowledge and wisdom of the land. Aside from folk stories, there are also Dai songs about the comings of herbs. For example, there is also a traditional song about the five treasures.

Cultural Aspect

Aside from collecting herbs and working with the herbalist, there were a lot of Dai cultural aspects to note too. The Dai have their own calendar that is based on the moon. On the fifteenth of the lunar calendar, there was the oil candle festival, where mainly women go to the temple in celebration of the saving of Buddha as well as to pray for a year's good food security. During this event, Mi had invited a friend to go to the temple. They would go around different baskets and shrines, putting down little bills, food, and water. In the center of the temple in front of the big Buddha statue, was a big bag of rice where each family had to bring rice to fill it up. During the event, thousands of little plates filled with vegetable oil and a small bee wax candle were placed down in the formation of certain Buddhist words in ancient Dai. The monk read Buddhist scriptures while everyone listened and prayed. When the monk had finished reading the scriptures, everyone would get up and light a few candles in the middle, completely lighting the Buddhist words.

This holiday came about from the legend where Buddha and his teachings were being threatened to extinction. There were powerful enemies against Buddha. Followers of his

teachings wanted to protect him, so thousands of people lit candles around him to ward off the evil spirits. One of these followers, on the way there, did not have enough money to buy oil to light his candle. When he went to the merchant, he begged and asked to have a little bit of oil, but the merchant would not give any. When the merchant saw the man's beautiful long hair, he said he would trade a little plate of vegetable oil for his hair. The man agreed. When he arrived to light his candle, there were thousands of others. However, when the evil enemies blew and attacked, every single candle went out. All except one, the man who sacrificed his own hair for a little plate of oil. No matter how hard the winds were, the candle would not blow out. He had saved Buddha.

Francis Commercon, a friend and mentor, had also introduced a lot of his friends in Menglun (including Mi). On one of the first few nights, he had shown where a lot of locals liked to watch Dai dancing and eat Dai barbeque. To get to know people, it is important to socialize and learn about their way of living. Locals here often like to get to know others by eating and sharing drinks over dinner.

Dai Hospital

The main Dai hospital is located in Jinghong City. The Dai hospital was once located near the Mekong river, towards the center of the city. However, because of larger expansion, it was relocated to near the airport in the 90s.

The Dai hospital follows traditional Dai medicine and uses herbs on a day to day basis. Though it is mainly Dai medicine, aspects and sections of the hospital are based on Western Medicine (WM) or Traditional Chinese Medicine (TCM). The Dai hospital itself receives support and teaching from a WM hospital, where surgeons teach and Dai doctors about surgical techniques and methods.

Though there are aspects of WM and TCM, Dai medicine still mainly revolves around herbal medicine. Dao Jun Wen had shown the different aspects and buildings of the hospital, as well as the history museum in the hospital. First to note is that all the ornamental plants around the hospitals are planted herbs that the hospital harvests weekly. There are over 100 different herb species that they plant. Other herbs they do not have, they request and ask gatherers in the mountain to collect for them.

He also showed the ward of the hospital for sleep therapy, where the hospital mixes modern technology with traditional herbal medicine. He showed these large pods where people would lay in and the steam of herbal concoctions would slowly cook and heal people. Another one was steaming a large mix of herbs and burring people in these herbs. They would then wrap the person up tightly and remain relaxed for thirty to sixty minutes. These techniques have proven to help people with their sleep, as well as physical mobility improvements.

Herbs

Latin Name	Function	Usage
<i>Acacia pennata (L.) Willd.</i>	Meningitis	Cooked, raw
<i>Achyranthes bidentata Blume</i>	Blood circulation, joint problems, inflammation, piles disease, hemorrhoids	Tea, soup, raw
<i>Adhatoda vasica. Nees.</i>	Menstrual cramps, fracture	Chopped and mixed with alcohol, cook roots for tea
<i>Asparagus meiocladus Leul.</i>	Lungs, chronic coughs, bronchitis, edema, hernia, prolactin	Cooked, powder
<i>Balanophora laxiflora Hemsl.</i>	Kidney, blood, and bone generation, antidote, high blood pressure	Cooked, raw, powder, good with steamed meat
<i>Baphicanthus cusia. Nees. O. Kuntze</i>	Detoxification, anti-inflammatory, sore throat, stomachache, swelling	Cook roots
<i>Bidens pilosa L.</i>	Blood pressure, circulation, malaria, joint pain, bug bites, antidote for poisons	Tea, soup, cooked. For poisonous bites, chew it up, swallow the juice and spit it out and apply to bite
<i>Blumea balsamifera</i>	Antidote, detoxification, burns, blisters, itches, sleep, headaches	Internal: cook roots. External: bake leaves and mix with alcohol, rub.
<i>Cassia siamea Lam</i>	Blood circulation, joints, swelling, itching, smelly feet, epilepsy	Cook bark into tea. Smelly feet: cook leaves and wash with solution
<i>Cassia tora Linn.</i>	High blood pressure, eyesight, constipation, headache, epilepsy	Tea from seeds, Cook roots for other
<i>Chrysanthemum coronarium L.</i>	Sleep	Tea, soup, cooked, raw
<i>Clerodendranthus spicatus (Thunb.) CY Wu</i>	Anti-inflammatory, nephritis, cystitis, rheumatism, kidney stones	Tea
<i>Clerodendrum indicum (L.) O.Ktze.</i>	Rheumatism, inflammation, detoxification	Chop and mix with alcohol, apply on skin
<i>Coix lacryma-jobi var.</i>	Kidney stones, detoxification	Tea, bake and steep in water
<i>Costus speciosus</i>	Detoxification, stasis, swelling, bone fractures, ear infections	Use liquid from stem as ear drops for ear infections, wrap, tea
<i>Cymbopogon citratus</i>	Headache, fever, fracture	Tea, wrap
<i>Dichondra repens Forst.</i>	Excess heat, fevers, high blood pressure, uric acid, cough, headache	Cooked, raw
<i>Euphorbia hirta</i>	Detoxification, skin diseases,	Use the latex and apply to

	acne, itchiness, bronchitis, indigestion, burns, ringworm	skin, for bath, cook with sulfur and bathe, internal: cook roots
<i>Glycyrrhiza uralensis</i> Fisch	Fatigue, ulcer sore, sore throat, stomach pain, asthma, cough, anti-inflammatory	Tea, juice
<i>Inula cappa</i> (Buch-Ham) DC.	Stomachache, cough	Tea, soup, raw, powder
<i>Laggera pteridonta</i> (DC.) Benth	Cough, sore throat, internal inflammation	Tea, a bit poisonous so don't use too often
<i>Mahonia fortunei</i> (Lindle.) Fedde	Burns, cuts, blisters, diabetes, high blood pressure, stomach	External: Powder bark Internal: Cook leaves & roots
<i>Maytenus hookeri</i> Loes	Cancer, anti-bacterial, antidote	Tea
<i>Mirabilis jalapa</i> L.	Diuretic, laxative, blood stasis	Cook roots or powder
<i>Paederia scandens</i> (L.) Merr.	Digestion, cough, menstruation, excess heat	Tea, soup
<i>Parochetus communis</i> Ham	Helps kidneys, male libido	Cooked, raw
<i>Plantago asiatica</i> L.	Anti-inflammatory, coughing, diabetes, obesity, bone fractures	Tea, soup, raw
<i>Rauvolfia verticillata</i> (Lour) Baill	Fever, antidote, excess heat, burns, blisters	Cooked, powder, paste
<i>Rhinacanthus nasutus</i>	Excess heat, lungs, itching, eczema	Chop up and mix with alcohol
<i>Sauropus androgynus</i> (L.) Merr.	Detoxification, swelling, anti-inflammatory, excess heat	Cooked
<i>Solanum erianthum</i> D. Don	Anti-inflammatory, swelling, uric acid	Wrap around swollen area, powder
<i>Spondias pinnata</i> (L.f.) Kurz	Detoxification, cough	Cook fruit, tea, soup, powder
<i>Streptocaulon griffithii</i> Hook. F.	Anti-inflammatory, sore throats, cough, lungs	Tea, soup
<i>Tacca chantrieri</i> Andre	Anti-inflammatory, detoxification, swelling, cuts	Powder its roots
<i>Vitex rotundifolia</i>	Excess heat, bone joints, strokes, detoxification	Bake leaves and apply, cook roots

Figure 2. Table of the collected herb's Latin name, medical property, and usage method.

It is important to note that the function of these herbs was discovered through traditional use and Mi's experience as an herbalist. These herbs may serve more functions and be used differently in different medicinal theories. For more detailed information on what they look like, function, usage, Chinese and Dai names, please refer to the physical herbarium specimen, currently at SIT's library in Kunming, Yunnan, China.

Major Changes

Major changes noted during this project include environmental impacts, loss of tradition, and commercialization.

For environmental impacts, the increase of rubber and banana plantations with an overall loss of natural forest in Xishuangbanna has made many herbs harder to find. Not only have some species become extinct, but many much rarer, where people all over the region have to import it from neighboring countries or illegally harvest it from conservation land. This has all sorts of economic, social, and political implications that may need further research. For Mi's clinic, they harvest and gather all the herbs they use themselves. However, some herbs cannot be found anywhere nearby anymore, so they have to go to Laos or Myanmar to get dried herbs. The Dai hospital in Jinghong, aside from the herbs they grow around the hospital, imports all their herbs from people they hire to specially go and collect mountain herbs. The distance, cost, and range to find these herbs are ever-increasing, becoming more difficult as time goes on.

A loss of tradition is also occurring as the region of Xishuangbanna is developing at a rapid pace. Boys are not required to go to the temple anymore to learn scripture, to learn Dai history and practices. There is a lesser literacy rate in reading and writing Dai. Recently, it was also banned for Dai boys to wear their traditional Buddhist robes to mainstream Han Chinese schools. Herbalism and Dai medicine are passed on from father to son at a lesser rate as universities are offering courses and basics of Dai medicine. However, these courses are not teaching students in the traditional sense of herbal collection in the mountains. Practices such as *cui gu* are rarely ever taught and becoming less and less practiced.

As the hospital expands and grows larger in accordance with the region's development, the Dai hospital will serve many more patients. This increase in patients is increasing demand for the production of medicine. From observation, the hospital imports

herbs at a commercial rate, ordering in bulk. This may have a lot of impacts economically, socially, and politically as it becomes a larger industry.

Interviews

A collection of fifteen informal interviews were collected, asking local people from Xishuangbanna about their preference in medicine and when they used each type. These interviews took place at small restaurants, taxi rides, and social events. From the fifteen informal interviews, the majority of people (thirteen) stated that they believed in the power of Dai medicine as an effective form of medicine. Only two locals were strongly for WM. Seven people stated that for minor sicknesses such as colds or fevers, they would often go to western medicine or let their bodies recover naturally. However, when it came to more serious injuries such as broken bones or fractures, they would go to Dai doctors. Eight people believed for serious illnesses such as cancer or other illnesses that require surgery, they would go to a WM hospital first. No one, in particular, was strongly for or against any form of medicine. The majority of people were open to trying out the different forms of medicine for their medical needs.

For the formal interviews with Dai doctors, when asked about the modern changes, a common answer was the increasing difficulty of finding certain herbs due to environmental change. Dao Jun Wen, who worked at the Dai hospital said that Dai medicine was also changing rapidly as the incorporation of WM technology was increasing. For example, x-ray machines and other machines were being incorporated for daily use and practice.

CONCLUSION

Dai medicine is an ancient form of medicine that has been practiced for thousands of years. To fully understand it, would require more than a lifetime of practice and experience.

However, from all the information gathered, it is common to see that herbalism plays a vital role in the practice of Dai medicine. The majority of physical medicine and substance comes from herbs that are often mixed with animal products, alcohol, and water, all where the majority of medicine comes from plants.

Herbs and medicine are also well-represented and an important part of Dai culture, where stories, folklore, and Buddhism combined create the foundation of the medicine. Ways of living revolve around health so Dai medicine plays a strong role in people's livelihood, making learning culture essential to better understand Dai medicine.

As Xishuangbanna continues to develop and change, the medicine and culture will also change with it. With what was found, the introduction of modern techniques and machines are playing a heavier role in understanding people's health. It is becoming integrated into the practice of Dai medicine. Aside from integrating new technology, the changing environment is also impacting the way people find their resources. Future studies should be conducted on the economic, political, and social implications of higher demands for herbs and animal parts that are becoming harder to find. It may also be important to continue further research on the direction and way Dai medicine is headed. Being a medicinal practice that heavily relies on the natural environment, looking at how it will be supported by its users, the government, and conservation groups over the coming decades are important.

FUTURE STUDIES

- Waste management in Xishuangbanna
- Relationships of the Dai across borders

- Development of the Tea industry in Xishuangbanna
- Traditional tea etiquette and customs around Pu'er tea
- Conservation lands in Xishuangbanna

APPENDICES

This was a great learning experience personally, academically, and culturally. Many difficulties were experienced throughout but were overcome with the kind and supportive people of Xishuangbanna. It is important to look at things with a lens of cultural relativism, where things may seem unacceptable to your own beliefs, but acceptable to other cultures. Things like cockfights, injured stray animals, and the slaughtering of animals were very common. Do what you can to help but know that there is only so much you can. You must remain positive and stick to your own beliefs, all while remaining respectful. There were many times of pressure to socialize and drink but know boundaries and set them. The people in Xishuangbanna are kind, forgiving, and respectful of your boundaries.

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