

The Mien people's ethnobotanical survey of medicinal plant use in Thailand and Vietnam

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Abstract. Panyadee P, Pongamornkul W, Van On T, Trong ND, Giang PTL, Kim LT, Inta A, Sirisa-Ard P, Chansakaow S. 2024. The Mien people's ethnobotanical survey of medicinal plant use in Thailand and Vietnam. *Biodiversitas* 25: 79-96. This study investigates the ethnomedicinal practices of the Mien people in Thailand and Vietnam, focusing on the diversity of medicinal plant usage and its implications for healthcare and traditional knowledge conservation. Through semi-structured interviews with key informants during transect walks in local forests and home gardens, data on 199 medicinal plant species were gathered, including vernacular names, plant parts used, preparation, and usage methods. Analysis revealed a significant use of these species, with 41 utilized for various health purposes in both countries, treating ailments related to reproductive systems (45 species), body strengthening (29 species), and the digestive system (21 species). In ethnobotanical practices, there were distinct preferences for plant parts. In Thailand, stems (29%), leaves (26%), whole plants (18%), and roots (14%) were predominantly used, while in Vietnam, leaves (29%), stems (24%), whole plants (19%), and roots (11%) were more common. A Spearman's rank correlation showed a strong positive correlation (0.77, $p < 0.001$) between these preferences in both countries. The study documented 81 ailments across 23 health categories. Thailand reported 45 ailments in 20 categories, and Vietnam 67 in 19 categories. Reproductive health, musculoskeletal health, and body wellness strengthening were pivotal, with strong correlations in healthcare practices between the countries (correlation 0.75, $p < 0.001$). Reproductive Health mainly involved postpartum treatment, Musculoskeletal Health focused on pain relief and rheumatism treatments, and Body Wellness Strengthening used plants as tonics and for relaxation. This research underscores the importance of preserving traditional knowledge and the potential of traditional medicine in rural healthcare. It also highlights the scope and focus of the Mien communities' healthcare practices, providing valuable insights for future research and drug development.

Keywords: Biodiversity conservation, ethnomedicine, ethnopharmacology, indigenous knowledge, sustainable use

INTRODUCTION

Ethnobotany, a multidisciplinary field, examines the relationship between humans and plants, particularly in traditional medicine, food, and cultural practices (Heinrich 2015; Albuquerque et al. 2017). It contributes to biodiversity conservation (Ahoyo et al. 2018; Constant and Tshisikhawe 2018), new medicine development (Porras et al. 2021), and healthcare improvement in marginalized communities (Kumar et al. 2021; Vardeman and Vandebroek 2022). Traditional medicinal practices, deeply rooted in centuries of knowledge, rely on local plant resources (López-Patiño et al. 2022). Understanding ethnobotanical knowledge among ethnic groups can reveal cultural and ecological influences on traditional medicine and identify new medicinal compounds.

The Mien people, or Yao, have a history spanning thousands of years, originating in central China and recognized as Landian Yao in China and Dao in Vietnam (Li et al. 2019). They have migrated to Vietnam, Laos, and Thailand, adapting to their environment and contributing significantly to Traditional Chinese Medicine (Lu et al.

2022). However, their traditional medicinal knowledge, often orally transmitted, faces a risk of loss (Yuyun 2006).

In Vietnam, the Red Mien/Dao, a subgroup of the Mien people with origins in China, are known for preserving their unique traditions, including traditional costumes, languages, beliefs, and especially the knowledge and practices of using plants for medicine. This Traditional Medicine Knowledge (TMK) stands apart from Vietnam's official Traditional Medicine System (TMS) and is more akin to traditional Han Chinese medicine. Despite this, the modernization of medicine and the national healthcare system's reach have led the Dao people to incorporate modern treatments for acute diseases, supplementing their traditional methods. In Thailand, despite facing challenges like poverty, low education, and social distance, initiatives like the Royal Project of King Rama IX have significantly improved their livelihood and cultural preservation. The Mien in Thailand, while embracing technologies like mobile phones and the Internet, continue to uphold their traditional lifestyle, showcasing a unique amalgamation of traditional values and modern adaptation within the dominant Thai society

(Tongdhamachart and Alwi 2023).

Economically and ecologically, the Mien people used to traditionally engage in swidden agriculture, also known as slash-and-burn agriculture, growing crops like dryland rice and maize. They predominantly lived in mountainous areas at elevations ranging from 800 to 1500 meters (Li et al. 2019). Their communities are often self-sufficient and isolated, organized around a clan-based social structure led by chieftains. Given their intimate knowledge of their local environment, traditional agricultural practices, and medicinal plant usage, the Mien people offer a significant opportunity for ethnobotanical research. However, in recent years, Mien communities have faced various challenges, including economic marginalization and land loss, resulting in the erosion of traditional knowledge and practices (Srithi et al. 2009).

In China, the traditional medicinal and dyeing practices of the Mien people have been extensively documented (e.g. Jin et al. 2018; Luo et al. 2018; Li et al. 2019; Shi et al. 2021; Hu et al. 2022; Lu et al. 2022). However, ethnobotanical studies on this community outside of China are relatively scarce. One notable study conducted in Nan Province, northern Thailand, identified over 160 species of medicinal plants predominantly used for birth-related conditions, such as postpartum herbal bath formulas and food supplements (Panyaphu et al. 2011). Despite this rich knowledge, another study indicated a gap between traditional knowledge and actual use, suggesting a decline in traditional practices among younger generations (Srithi et al. 2009). Additionally, Mien homegardens in Thailand were found to host a diverse range of 270 plant species, underscoring their importance as a unique and valuable resource for both floristic diversity and cultural significance (Srithi et al. 2012).

In Vietnam, ethnobotanical studies on the Mien people, also known locally as Dao, are relatively scarce but reveal a wealth of traditional knowledge. One study conducted in Ba Vi National Park identified the Mien as the major users of over 200 medicinal plant species in the park (Van On et al. 2001). Another study in the same national park highlighted

that the Mien ethnic group utilized 144 species of medicinal plants and had superior knowledge compared to the Muong people in the area (Sam 2012). Subsequent research found that the Mien (Red Yao) use 94 plant species specifically for medical baths and raised concerns about the declining reserve of medicinal herbs, with 19 species identified as endangered (Phíp et al. 2009). The most recent study, conducted in Ha-Tinh Province, emphasized that Mien elders were the primary users of the species described, particularly in the foothills of the Annamite Mountains range (Whitney et al. 2016). Collectively, these studies underscore the Mien people's rich ethnobotanical knowledge in Vietnam, despite the limited number of studies conducted in the region.

This study aims to fill a knowledge gap in Mien ethnobotany in Thailand and Vietnam. It will document and catalogue medicinal plants used by the Mien communities, comparing ethnobotanical knowledge between these countries, thereby enriching the field of ethnobotanical research in Southeast Asia.

MATERIALS AND METHODS

Study site

The ethnobotanical investigation was conducted in three Mien villages across Thailand and Vietnam from 2018 to 2020 (Figure 1). In Thailand, the study focused on two Mien villages: Sancharurn and Ban Namki, both located in Nan Province. This province, situated in northern Thailand, is characterized by its mountainous terrain and tropical monsoon climate. The region experiences a rainy season from May to October and a dry season from November to April. Average temperatures in Nan Province range from 20–35°C, with the highest typically in April and the lowest in December. The area receives an average annual rainfall of 1500–2000 mm, peaking in August and at its lowest in February.

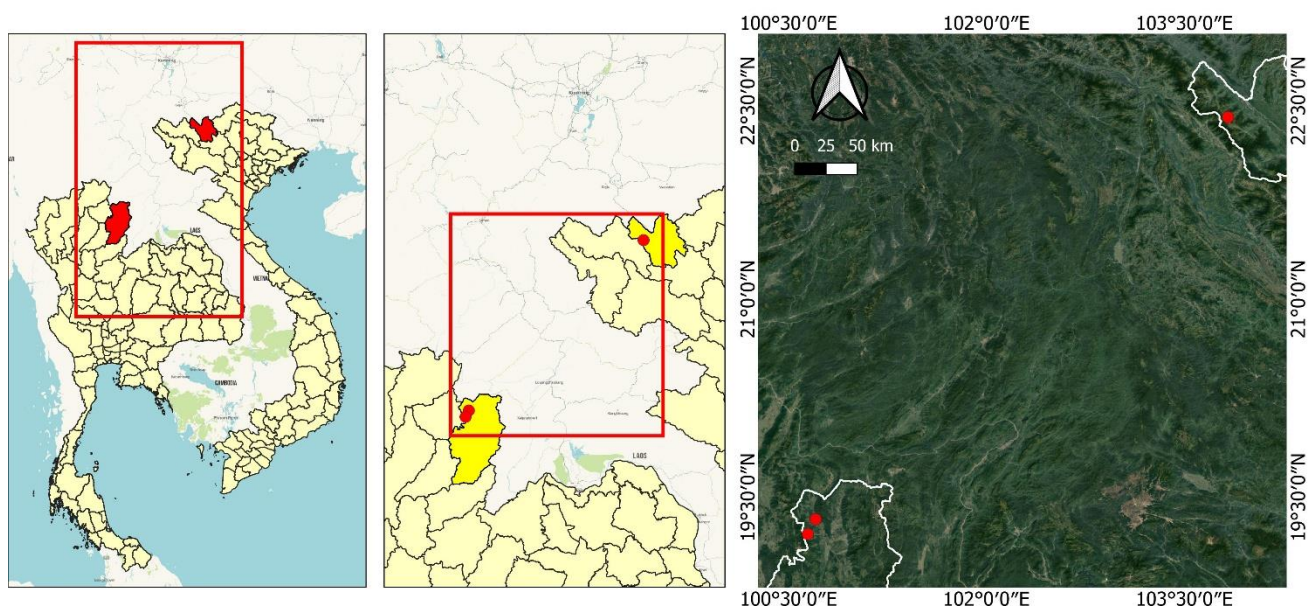


Figure 1 The location of study sites, two villages in Thailand and another village in Vietnam

Table 1. Age and gender distribution of interviewees from Thailand and Vietnam

Gender	Age	Thailand	Vietnam	Grand Total
Female	20-29	1	-	1
	30-39	2	2	4
	50-59	1	2	3
	60-69	-	1	1
	70-80	-	2	2
Female total		4	7	11
Male	30-39	-	1	1
	50-59	1	2	3
	60-69	1	1	2
	70-80	-	1	1
Male total		2	5	7
Grand total		6	12	18

Sancharum and Ban Namki, while being distinct villages, were considered as one unit for this research due to several factors. Both share a similar geographical and climatic profile, ensuring environmental consistency for the study. The proximity of these villages also allows for cultural and botanical overlap, crucial for comparing with the Mien village in Vietnam. This setup provided a cohesive environment for analyzing the ethnobotanical practices within a consistent yet diverse cultural and ecological framework.

In Vietnam, the ethnobotanical study was conducted in Ta Phin Village, Sapa District, which is located in the northwest of Vietnam in Lao Cai Province. The area has a cool temperate climate, with an average temperature between 15-20°C and an annual average rainfall of 1500-2000 mm, and the elevation range from 1500-1650 meters above sea level. This area is characterized by two distinct seasons: A rainy season that runs from May to September, and a dry season that runs from October to April. The highest temperatures are recorded in August and September, while the lowest temperatures are recorded in December and January. It is known for its high humidity, with fog and mist often present in the morning and early afternoon.

The Iu Mien, originating over 2000 BC in areas like Yunnan and Guangdong, were known for their mobility, especially the Phan (Bienh) group. Their mythology, encapsulated in "King Ping's Charter," describes the origins of the twelve Yao tribes. Escaping taxes and seeking new lands, the Mien spread to northern Vietnam, Laos, and Thailand from Southern China by the 15th-16th century. They first settled in Chiang Rai, Thailand, over 200 years ago, cultivating opium and later diversifying into animal husbandry, paddy fields, and cornfields, a shift reflecting their adaptive journey across centuries (Tongdhamachart and Alwi 2023).

Collecting ethnomedicinal knowledge

Firstly, we obtained informed consent from community leaders and conducted group discussions to identify experienced local healers as key informants. These informants were interviewed using a semi-structured approach during transect walks in local forests and home gardens. The interviews not only covered the identification

of medicinal plants, which were captured through ethnographic observation and photographic documentation, but also delved into the cultural significance of these plants within the community. A comprehensive database was compiled to catalogue all identified plants and their associated knowledge. To facilitate a comparative analysis, a consistent set of questions and observation metrics was used across both countries. This methodology thus aimed to provide an in-depth, qualitative account that supplemented existing ethnobotanical data, enabled comparative analysis between the two countries, and offered a rich, emic perspective on the cultural significance of medicinal plants and knowledge.

This research adhered to the ethical guidelines outlined by the International Society of Ethnobiology Code of Ethics (International Society of Ethnobiology 2006), ensuring all procedures were conducted in compliance with these established principles. Prior to conducting interviews and field observations, informed consent was obtained from all participants, including community leaders and key informants. The consent process clearly outlined the objectives of the research, the expected duration of participation, and how the collected data would be stored, used, and published. Participants were informed that their involvement was voluntary and that they could withdraw from the study at any time without any repercussions. Additionally, all collected data was treated with the utmost confidentiality; personal identifiers were anonymized in any publications or presentations arising from this research.

Plant identification and categorization

The plant specimens that were gathered in the field survey were placed in the Herbarium of Queen Sirikit Botanic Garden (QBG) and the Herbarium of Medicinal Plants at Hanoi University of Pharmacy (HNIP). Along with the specimens, photos were taken during the survey. The identification of the plant species and their families was determined by referring to the Plants of the World Online Database (powo.science.kew.org). This database is a reliable source that provides updated information on the current scientific names and families of plant species.

The methodology utilized in this research involved an emic standpoint, which signifies that the classification of disorders and treatments is founded on the participants' subjective accounts and viewpoints, rather than being dictated by external researchers or authorities. The emic perspective enables a culturally suitable investigation, resulting in a comprehensive grasp of the population's outlooks and experiences with the disorders and treatments under scrutiny.

Data analysis

The data analysis comprehensively utilized RStudio, version 4.3.2, for all statistical analyses. This powerful statistical software was instrumental in processing and interpreting the complex ethnobotanical data gathered from the Mien communities in Thailand and Vietnam. Specifically, the Chi-square test was employed to test the differences in the number of species between the two countries, highlighting the regional variations in medicinal

plant usage. Additionally, Spearman's rank correlation analysis was performed to examine the relationship in the trend of plant use between Thailand and Vietnam, identifying significant patterns and correlations in medicinal practices. This analysis was pivotal in understanding the nuances of how medicinal plant use varies and aligns across these regions.

RESULTS AND DISCUSSION

Diversity of medicinal plants used by Mien people

A total of 18 healers were interviewed, comprising 6 from Thailand and 12 from Vietnam, with ages ranging from 24 to 75 years. The group consisted of 11 female and 7 male informants (Table 1). The study revealed substantial ethnobotanical knowledge among the Mien people in Thailand and Vietnam, identifying a total of 198 medicinal plant species used by this community. In Thailand, 119 use reports were documented, encompassing 79 species, 71 genera, and 43 families. In contrast, Vietnam exhibited a higher diversity with 231 use reports, 160 species, 133 genera, and 77 families. Notably, there was a 21% overlap in species, a 28% overlap in genera, and a 41% overlap in families between the two countries. Statistical analysis using the Chi-square test indicated that the ethnobotanical data from Thailand and Vietnam are significantly different ($p < 0.01$), highlighting the regional variations in medicinal plant usage within the Mien community.

The study also highlighted the prevalence of specific plant families used medicinally by the Mien people in both

Thailand and Vietnam. The most commonly utilized families across both countries were Asteraceae, Lamiaceae, Menispermaceae, Moraceae, Euphorbiaceae, and Zingiberaceae, with the number of species being 15, 9, 8, 7, 7, and 7, respectively. These families also had varying numbers of use reports: 29 for Asteraceae, 11 for Lamiaceae, 10 for Menispermaceae, 11 for Moraceae, 14 for Euphorbiaceae, and 16 for Zingiberaceae. When examined by country, the three most common families in Thailand were Asteraceae, Moraceae, and Menispermaceae, with 6, 5, and 5 species and 9, 6, and 6 use reports, respectively. In Vietnam, the leading families were Asteraceae, Lamiaceae, and Zingiberaceae, with 14, 8, and 7 species and 20, 10, and 13 use reports, respectively. This data underscores the regional variations in plant family utilization for medicinal purposes within the Mien community.

Plant parts used for traditional medicine

In the ethnobotanical practices among the Mien communities in Thailand and Vietnam, there were notable preferences for specific plant parts used for medicinal purposes. In Thailand, the most frequently utilized plant parts were stems (29%), leaves (26%), whole plants (18%), and roots (14%), based on the total usage reports. In contrast, in Vietnam, leaves were most commonly used at 29%, followed by stems at 24%, whole plants at 19%, and roots at 11% (Table 2). A Spearman's rank correlation analysis revealed a strong positive correlation between the preferences for plant parts in Thailand and Vietnam, with a coefficient of 0.77 ($p < 0.001$; Figure 2).

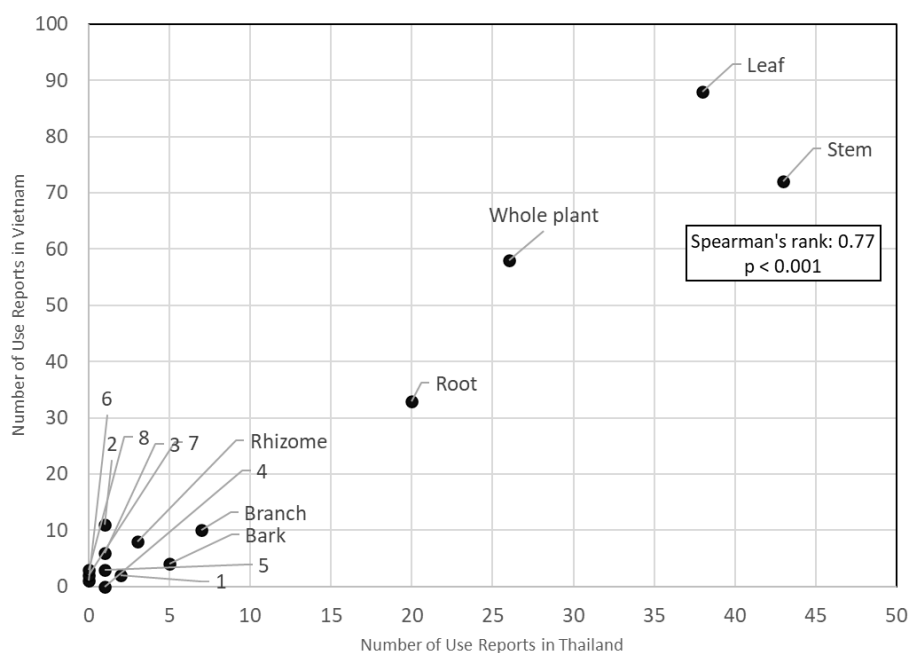


Figure 2. Scatter plot illustrating the relationship between the number of use reports for various plant parts in Thailand and Vietnam (1: Flower, 2: Aerial part, 3: Fruit, 4: Not Mention, 5: Tuber, 6: Thorns, 7: Seed, 8: Style)

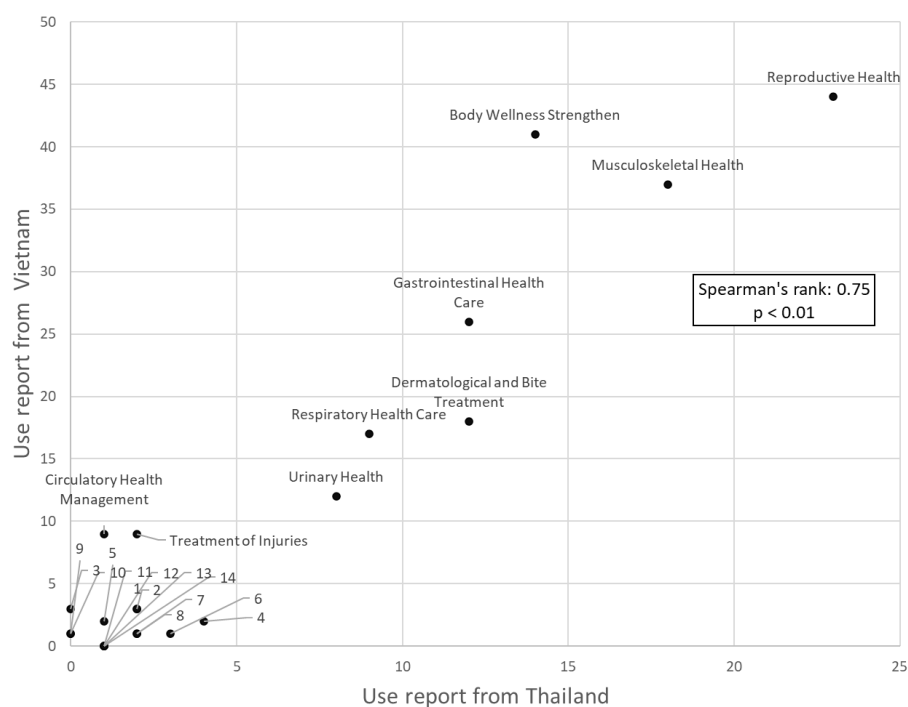


Figure 3. Scatter plot illustrating the relationship between the number of use reports for various use categories in Thailand and Vietnam (1: Fever and Flu Management, 2: Liver and Detoxification Care, 3: Headache Management, 4: Parasitic Infection Treatment, 5: Metabolic and Glucose Management, 6: Ocular Health, 7: Cervical Cancer Treatment, 8: Mental Health and Sleep Quality, 9: Inflammation Management, 10: Hair Care, 11: Lymphatic Disease Treatment, 12: Fluid Retention Management, 13: Paralysis Treatment, 14: Tuberculosis Treatment)

Treatment for various ailments

In our study, a total of 81 ailments were reported and categorized into 23 distinct health categories (Figure 3). When broken down by country, Thailand accounted for 45 ailments across 20 categories, while Vietnam contributed 67 ailments spanning 19 categories. The most pivotal categories across both countries were reproductive health, musculoskeletal health, and body wellness strengthening. Specifically, in Thailand, these categories had 23, 18, and 14 use reports, involving 20, 17, and 12 species, respectively. In Vietnam, the figures were 44, 41, and 37 use reports, with 43, 38, and 34 species, respectively. A Spearman's rank correlation test showed a strong positive correlation of 0.75 ($p < 0.001$) between the healthcare categories prioritized in

Thailand and Vietnam, indicating significant similarities in healthcare practices across these communities.

Focusing on the most important categories, Reproductive Health predominantly involves medicinal plants related to postpartum treatment, contributing to approximately 95% of the use reports in both countries. Musculoskeletal health mainly encompasses plants used for body pain relief and treating rheumatism. As for Body wellness strengthening, plants are commonly used as tonics and for body relaxation and recovery from illness or fatigue, with general tonics being the most frequently cited. Overall, this data provides a nuanced understanding of the health categories that the Mien communities prioritize, offering valuable insights into the scope and focus of their traditional healthcare knowledge.

Table 2 List of medicinal plants used by Mien people in Thailand and Vietnam

Species	Voucher no.	Mien name	Country	Part used	Use category	Uses
<i>Acorus calamus</i> L.	HNIP/18697	<i>Dang pau vam</i>	Vietnam	Whole plant	Head washing for long hair	Crushing and mixing with water, and using the concoction for hair washing, believed to promote hair growth.
<i>Acorus gramineus</i> Aiton	WP5412	<i>Xa pau</i>	Thailand	Whole plant	Musculoskeletal	Use to treat obstetric disease
	-	<i>Cham pow</i>	Thailand	Whole plant	Body strengthens	Bathing for after illness recovery
					Reproductive	Bathing as a postpartum tonic
					Rheumatism	Use to treat rheumatism
<i>Actinidia callosa</i> Lindl.	HNIP/18698	<i>Sanh pau</i>	Vietnam	Whole plant	Reproductive	Bathing as a postpartum tonic
	HNIP/18699	<i>Nhung truy m'hay</i>	Vietnam	Aerial part	Reproductive	Bathing as a postpartum tonic
<i>Aeschynanthus parasiticus</i> (Roxb.) Wall.	HNIP/18765	<i>Dia diang</i>	Vietnam	Root, Stem, Leaf	Blood and blood vessels	Drinking aqueous decoction as a blood tonic
					Musculoskeletal	Use to treat obstetric disease
<i>Ageratina adenophora</i> (Spreng.) R.M.King & H.Rob.	HNIP/18722	<i>Tang xien mia</i>	Vietnam	Whole plant	Skin	Use to treat skin burn
<i>Ageratum conyzoides</i> L.	-	<i>Tran mieu mia</i>	Thailand	Whole plant	Respiratory	Use to treat cold
						Use to treat sinusitis
	HNIP/18723	<i>Tran mieu mia</i>	Vietnam	Whole plant	Respiratory	Use to treat cold
						Use to treat sinusitis
<i>Aglaonema</i> sp.	WP5438	<i>Bon duh</i>	Thailand	Whole plant	Insect bites	Use to treat insect bites
<i>Agrimonia pilosa</i> Ledeb.	HNIP/18826	<i>Xo dia pi'</i>	Vietnam	Whole plant	Dysentery	Use to treat dysentery
<i>Alangium chinense</i> (Lour.) Harms	-	-	Thailand	Leaf	Body strengthens	Bathing for health promotion
						Fatigue treatment
<i>Alnus nepalensis</i> D.Don	HNIP/18739	<i>Dieng lien</i>	Vietnam	Bark	Rheumatism	Use to treat rheumatism
<i>Alpinia</i> sp.	HNIP/18849	<i>La co gian</i>	Vietnam	Whole plant	Body strengthens	Bathing for health promotion
					Reproductive	Use as a postpartum tonic
<i>Ancistrocladus tectorius</i> (Lour.) Merr.	HNIP/18704	<i>Chai mun zia</i>	Vietnam	Stem	Digestive system	Use to treat stomachache
					Pain management	Use to treat muscle pain
	WP5422	<i>Jad mun dia</i>	Thailand	Stem	Digestive system	Use to treat stomachache
					Pain management	Use to treat muscle pain
<i>Anredera cordifolia</i> (Ten.) Steenis	HNIP/18736	<i>Dia chun</i>	Vietnam	Leaf	Injury	Use to treat bruised
					Pain management	Use as a pain reliever
					Reproductive	Consuming as a vegetable for postpartum support
	WP5512	-	Thailand	Leaf	Pain management	Use as a pain reliever
<i>Archidendron clypearia</i> (Jack) I.C.Nielsen	WP5405	<i>Chinh sui zia</i>	Thailand	Whole plant	Eye trouble	Use to wash eyes
<i>Argyreia capitiformis</i> (Poir.) Ooststr.	HNIP/18747	<i>Dia nit</i>	Vietnam	Whole plant	Musculoskeletal	Bathing for arthritis management
<i>Aristolochia acuminata</i> Lam.	-	<i>Co tan mahy</i>	Thailand	Stem	Anthelmintic	Use as anthelmintic
	HNIP/18715	<i>Co tan mahy</i>	Vietnam	Stem	Anthelmintic	Use as anthelmintic
<i>Artabotrys</i> sp.	HNIP/18705	<i>Chu biet mahy</i>	Vietnam	Stem	Skin	Bathing for skin rejuvenation
<i>Artemisia lactiflora</i> Wall. ex DC.	-	<i>Kaeo mueang jin</i>	Thailand	Aerial part	Reproductive	Use as a postpartum tonic
	HNIP/18724	<i>Ngai chan vit</i>	Vietnam	Aerial part	Reproductive	Use as a postpartum tonic
<i>Asarum cordifolium</i> C.E.C.Fisch.	HNIP/18716	<i>Pien pha</i>	Vietnam	Whole plant	Injury	Use to treat a wound

					Pain management	Use of aqueous decoction for topically managing pain
<i>Asarum glabrum</i> Merr.	HNIP/18717	<i>Pien pha</i>	Vietnam	Whole plant	Pain management	Wound soaking for a pain relief
<i>Asplenium nidus</i> L.	-	<i>Tam chang lau</i>	Thailand	Whole plant	Reproductive	Bathing as a postpartum tonic
<i>Berberis hancockiana</i> (Takeda) Laferr.	HNIP/18737	<i>Hoang len</i>	Vietnam	Stem	Digestive system	Use aqueous decoction or alcohol-infused remedy to treat stomachache
					Liver	Use aqueous decoction or alcohol-infused remedy as a liver tonic
<i>Berberis sargentiana</i> C.K.Schneid.	HNIP/18738	<i>Hoang len</i>	Vietnam	Root, Stem	Digestive system	Drink aqueous decoction to treat stomachache
<i>Berchemia floribunda</i> (Wall.) Brongn.	WP5513	<i>Zsiet lhe diaang</i>	Thailand	Leaf	Dysentery	Drink aqueous decoction to treat dysentery
					Eye trouble	Consuming a tea prepared from young leaves for improving visual acuity
				Root	Pain management	Use as a pain reliever
<i>Bidens pilosa</i> L.	HNIP/18725	<i>Che cong yim</i>	Vietnam	Leaf	Hemorrhoids	Use to treat hemorrhoids
<i>Bischofia javanica</i> Blume	-	<i>Deng sui</i>	Thailand	Leaf, Bark	Digestive system	Use to treat diarrhea
	HNIP/18802	<i>Deng sui</i>	Vietnam	Leaf, Bark	Digestive system	Use to treat diarrhea
<i>Blumea balsamifera</i> (L.) DC.	-	<i>Mua in bua'</i>	Thailand	Leaf	Fever and flue	Use to treat fever
	HNIP/18726	<i>Boh ong een, een bot</i>	Vietnam	Leaf, Stem	Fever and flue	Use to treat flu
					Pain management	Use to treat headache
					Rheumatism	Consume aqueous decoction to treat rheumatism
<i>Blumea densiflora</i> DC.	HNIP/18727	<i>Boh ong een</i>	Vietnam	Leaf	Skin	Use to treat itchy skin
<i>Blumea martiniana</i> Vaniot	HNIP/18728	<i>Tam tha mia</i>	Vietnam	Leaf	Tonic	Consuming as tonic
<i>Brassaiopsis</i> sp.	-	<i>So phim dieng</i>	Thailand	Leaf and Stem	Body strengthens	Bathing for health promotion
<i>Broussonetia kaempferi</i> Siebold	HNIP/18796	<i>Dia do chang</i>	Vietnam	Stem and Root	Reproductive	Bathing as postpartum tonic
<i>Broussonetia papyrifera</i> (L.) L'Hér. ex Vent.	-	<i>Nac</i>	Thailand	Bark	Urinary and kidney	Consuming an aqueous decoction as a treatment for yellow urine
<i>Buddleja macrostachya</i> Benth.	HNIP/18841	<i>Hang chang peng</i>	Vietnam	Leaf, Stem	Pain management	Use to treat body pain
<i>Buddleja officinalis</i> Maxim.	-	<i>Hang chang jiang peng</i>	Thailand	Flower	Eye trouble	Use to treat eye trouble
	HNIP/18842	<i>Hang chang jiang peng</i>	Vietnam	Flower	Eye trouble	Use to treat eye trouble
<i>Callicarpa rubella</i> Lindl.	HNIP/18774	<i>Puay dom mia</i>	Vietnam	Leaf	Pain management	Use topically to treat headache
<i>Carpesium abrotanoides</i> L.	HNIP/18729	<i>Ngong lai cong</i>	Vietnam	Whole plant	Skin	Use to treat itchy skin
<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	HNIP/18730	<i>Cu cha mia</i>	Vietnam	Leaf, Root	Gastric ulcer	Use to treat gastric ulcer
					Injury	Use to stop bleeding
	WP5462	<i>Cu cha mia</i>	Thailand	Leaf	Injury	Use to treat a wound
				Root	Gastric ulcer	Use to treat gastric ulcer
<i>Cinnamomum</i> sp.	-	<i>Che lo deng</i>	Thailand	Bark	Body strengthens	Bathing for health promotion
<i>Cissampelopsis volubilis</i> (Blume) Miq.	HNIP/18731	<i>Puong dia bua'</i>	Vietnam	Whole plant	Body strengthens	Bathing for health promotion
<i>Cissus assamica</i> (M.A.Lawson) Craib	-	<i>Che gay ziet mahy si; keng chin si</i>	Thailand	Root	Pain management	Use as a pain reliever
<i>Claoxylon longifolium</i> (Blume) Endl. ex Hassk.	-	<i>Deng tan mien kong</i>	Thailand	Leaf	Reproductive	Use young leaf cooked with eggs as a dietary supplement for postpartum women
				Stem	Anthelmintic	Use as anthelmintic
	HNIP/18753	<i>Deng tan mien kong</i>	Vietnam	Leaf	Reproductive	Use young leaf cooked with eggs as a dietary supplement for postpartum women

<i>Clematis buchananiana</i> DC.	HNIP/18819	<i>Puong dia nhau</i>	Vietnam	Stem Leaf, Stem	Anthelmintic Reproductive	Use as anthelmintic Consuming or bathing aqueous decoction as a postpartum tonic
<i>Clerodendrum bungei</i> Steud.	HNIP/18775	<i>La go dieng</i>	Vietnam	Leaf	Digestive system Respiratory	Use to treat digestive disorders Use to treat cough
<i>Cnestis palala</i> (Lour.) Merr.	HNIP/18746	<i>Kam ziam mahy</i>	Vietnam	Leaf and Stem	Blood and blood vessels	Use as a blood tonic
	WP5466	<i>Kam zian mahy</i>	Thailand	Whole plant	Blood and blood vessels	Use as a blood tonic
<i>Codonopsis javanica</i> (Blume) Hook.f. & Thomson	HNIP/18740	<i>Co nho doy</i>	Vietnam	Root	Reproductive	Consuming as a vegetable for postpartum support
<i>Coix lacryma-jobi</i> L.	HNIP/18808	<i>No a dam</i>	Vietnam	Aerial part Seed	Diabetes Reproductive	Use to treat diabetes Consuming for health promotion in elderly and postpartum women
<i>Combretum latifolium</i> Blume	-	<i>M'hay vieng</i>	Thailand	Stem	Urinary and kidney	Consume aqueous decoction to treat kidney disorders
	HNIP/18744	<i>M'hay vieng</i>	Vietnam	Stem	Urinary and kidney	Consume aqueous decoction to treat kidney disorders
<i>Coptis chinensis</i> Franch.	HNIP/18820	<i>Dia im</i>	Vietnam	Tuber	Digestive system	Use to treat stomachache
<i>Cyclea barbata</i> Miers	-	<i>Chan zia doy</i>	Thailand	Whole plant	Digestive system	Use to treat stomachache
	HNIP/18792	<i>Chan zia doy</i>	Vietnam	Whole plant	Digestive system	Use to treat stomachache
<i>Cyclea polypetala</i> Dunn	HNIP/18793	<i>Piu coi doi</i>	Vietnam	Root	Musculoskeletal	Use to treat arthritis
<i>Derris elliptica</i> (Wall.) Benth.	-	<i>Ngong uon may</i>	Thailand	Root	Skin	Use to treat skin diseases
	HNIP/18760	<i>Ngong uon may</i>	Vietnam	Root	Skin	Use to treat skin diseases
<i>Dichroa febrifuga</i> Lour.	HNIP/18771	<i>Dia pam</i>	Vietnam	Leaf, Stem	Pain management	Use to relieve joint sprain
<i>Dichrocephala integrifolia</i> (L.f.) Kuntze	HNIP/18732	<i>La ngoi</i>	Vietnam	Whole plant	Pain management	Use to treat headache
<i>Dicliptera tinctoria</i> (Nees) Kostel.	HNIP/18694	<i>Cham</i>	Vietnam	Aerial part	Blood and blood vessels	Use as a blood tonic
<i>Dimetia capitellata</i> (Wall. ex G.Don)	HNIP/18828	<i>Diang meu kong</i>	Vietnam	Leaf and Stem	Digestive system	Use to treat peptic ulcer
Neupane & N.Wikstr.	WP5511	<i>Diang meu kong</i>	Thailand	Root	Rheumatism Fever and flue Respiratory	Use to treat rheumatism Use to treat fever Use as cough or cold remedy
<i>Dioscorea cirrhosa</i> Lour.	HNIP/18750	<i>Doi tru</i>	Vietnam	Leaf	Hemostatic medicine	Use as hemostatic medicine
<i>Diploclisia glaucescens</i> (Blume) Diels	-	<i>Keng chin doi</i>	Thailand	Root	Skin	Use to treat skin diseases
	HNIP/18794	<i>Keng chin doi</i>	Vietnam	Root and Stem	Skin	Use to treat skin diseases
<i>Dracaena cochinchinensis</i> (Lour.) S.C.Chen	-	<i>Put ha dia</i>	Thailand	Root	Respiratory	Use to treat cough
	HNIP/18718	<i>Put ha dia</i>	Vietnam	Root	Respiratory	Use as a cough remedy
<i>Dracaena</i> sp.	HNIP/18719	<i>Put ha dia</i>	Vietnam	Root, Stem	Respiratory	Use as a cough remedy
<i>Dracaena terniflora</i> Roxb.	HNIP/18720	<i>Chan zia doy</i>	Vietnam	Root	Respiratory	Use as a cough remedy
	WP5426	<i>Chan zia doy</i>	Thailand	Root	Respiratory	Use as a cough remedy
		<i>Ha dia</i>	Thailand	Root, Stem	Respiratory	Use as a cough remedy Use to treat cough
<i>Elaeagnus loureiroi</i> Champ.	HNIP/18751	<i>Co cai piu</i>	Vietnam	Leaf	Tuberculosis Respiratory	Use to treat tuberculosis Use as cough remedy Use to treat aphonia
<i>Elephantopus scaber</i> L.	WP5455	-	Thailand	Whole plant	Beriberi	Use to treat beriberi
<i>Eleutherococcus trifolius</i> (L.) S.Y.Hu	-	-	Thailand	Whole plant	Rheumatism Tonic	Use to treat rheumatism Consuming for health promotion

<i>Elsholtzia blanda</i> (Benth.) Benth.	HNIP/18776	<i>Pa ma mia', Ngon lai</i>	Vietnam	Whole plant	Skin	Use to treat ring worm
<i>Elsholtzia ciliata</i> (Thunb.) Hyl.	HNIP/18777	<i>Keng pam mia</i>	Vietnam	Whole plant	Rheumatism	Use to treat rheumatism
<i>Elsholtzia penduliflora</i> W.W.Sm.	HNIP/18778	<i>Dia sai</i>	Vietnam	Whole plant	Fever and flue	Topical application of fresh leaf as a poultice for reducing fever
<i>Embelia ribes</i> Burm.f.	WP5440	<i>Ta pau thop sui</i>	Thailand	Leaf, Stem	Skin	Use to treat chickenpox
<i>Embelia sessiliflora</i> Kurz	WP5514	<i>Ta pau thop sui</i>	Thailand	Stem	Skin	Use to treat itchy skin
						Use to treat skin rashes
<i>Equisetum diffusum</i> D.Don	HNIP/18752	<i>Pat thop mia'</i>	Vietnam	Whole plant	Hemorrhoids	Use to treat hemorrhoids
<i>Erythralium scandens</i> Blume	HNIP/18799	<i>Chau dun mahy</i>	Vietnam	Stem	Urinary and kidney	Use to treat kidney disorders
	WP5463	<i>Chau dun mahy</i>	Thailand	Leaf	Digestive system	Use to treat stomachache
				Stem	Urinary and kidney	Use to treat kidney disorders
<i>Euphorbia heterophylla</i> L.	WP5542	-	Thailand	Whole plant	Anthelmintic	Use as anthelmintic
<i>Euphorbia pulcherrima</i> Willd. ex Klotzsch	HNIP/18755	<i>Dang nai dieng</i>	Vietnam	Leaf and Flower	Reproductive	Consuming as a vegetable for postpartum support
<i>Exbucklandia tonkinensis</i> (Lecomte) H.T.Chang	HNIP/18767	<i>Chap tai bac boh</i>	Vietnam	Leaf	Body strengthens	Bathing for health promotion
					Reproductive	Use as a postpartum tonic
<i>Ficus fistulosa</i> Reinw. ex Blume	WP5508	<i>Sing quan mhay</i>	Thailand	Leaf and Bud	Reproductive	Consuming as a vegetable for postpartum support
<i>Ficus hirta</i> Vahl	WP5403	<i>Puong dia thong, Cha kiinh mia'</i>	Thailand	Whole plant	Urinary and kidney	Use to treat kidney stone
		<i>Xa cau thong</i>	Thailand	Leaf, Root	Dysuria	Use to treat dysuria
<i>Ficus sagittata</i> Vahl	-	<i>Dia sieu</i>	Thailand	Whole plant	Reproductive	Bathing as a postpartum tonic
	HNIP/18797	<i>Dia sieu</i>	Vietnam	Leafy branch	Body strengthens	Bathing for health promotion
					Reproductive	Use as a postpartum tonic
<i>Ficus semicordata</i> Buch.-Ham. ex Sm.	HNIP/18798	<i>Si cau pien</i>	Vietnam	Leaf	Body strengthens	Bathing for health promotion
					Reproductive	Use as a postpartum tonic
<i>Ficus triloba</i> Buch.-Ham. ex Voigt	WP5411	<i>Dia thong si, Scau thong</i>	Thailand	Root	Urinary and kidney	Use to treat kidney stone
<i>Fissistigma polyanthoides</i> (Aug.DC.) Merr.	HNIP/18706	<i>To biet m'hay</i>	Vietnam	Leaf, Stem	Reproductive	Use as a postpartum tonic
<i>Fissistigma retusum</i> (H.Lév.) Rehder	HNIP/18707	<i>To biet m'hay</i>	Vietnam	Leaf, Stem	Reproductive	Use as a postpartum tonic
<i>Gelsemium elegans</i> (Gardner & Champ.) Benth.	HNIP/18764	<i>Dang meu.</i>	Vietnam	Leaf, Stem	Pain management	Use for back pain management
<i>Glechoma longituba</i> (Nakai) Kuprian.	HNIP/18779	<i>Ngong cau puong</i>	Vietnam	Aerial part	Injury	Topical application of fresh leaf as a poultice for treating wound
						Use to treat a wound
<i>Gmelina arborea</i> Roxb. ex Sm.	WP5496	<i>Ta chuung cong</i>	Thailand	Bark	Gastric ulcer	Use to treat gastric ulcer
<i>Gmelina asiatica</i> L.	HNIP/18780	<i>Ta chung cong</i>	Vietnam	Bark	Digestive system	Consuming aqueous decoction to treat gastric ulcer
<i>Gnetum latifolium</i> Blume	HNIP/18766	<i>Deng muoi may</i>	Vietnam	Stem	Rheumatism	Consuming aqueous decoction to treat rheumatism
<i>Gnetum montanum</i> Markgr.	-	<i>M'hay mui</i>	Thailand	Stem	Rheumatism	Use to treat rheumatism
<i>Gonocaryum lobbianum</i> (Miers) Kurz	-	<i>Nom dia jieng</i>	Thailand	Leaf, Stem	Pain management	Use as a pain reliever
	HNIP/18742	<i>Nom dia Dieng</i>	Vietnam	Leaf, Stem	Pain management	Use as a pain reliever
<i>Gouania leptostachya</i> DC.	HNIP/18823	<i>Puong dia nhau</i>	Vietnam	Leaf, Root	Inflammation	Use to treat atopic inflammation
	WP5486	<i>Puong dia nhau</i>	Thailand	Root	Nervous system	Use to treat convulsion
<i>Gynostemma longipes</i> C.Y.Wu	HNIP/18748	<i>Dam chua mia</i>	Vietnam	Entire plant	Skin	Use to treat scabies
<i>Gynostemma pentaphyllum</i> (Thunb.) Makino	HNIP/18749	<i>Pu tay im luong</i>	Vietnam	Whole plant	Body strengthens	Use aqueous extract for topical application as a cool remedy

<i>Gynura barbareifolia</i> Gagnep.	HNIP/18733	<i>Mia trun</i>	Vietnam	Leaf	Tonic Reproductive	Consuming as a bitter tonic Consuming as a vegetable for postpartum support
<i>Gynura bicolor</i> (Roxb. ex Willd.) DC.	HNIP/18734	<i>Che oh lay</i>	Vietnam	Leaf and Bud	Reproductive	Consuming as a vegetable for postpartum support
	WP5501	<i>Jae oh ai</i>	Thailand	Leaf and Bud	Reproductive	Increases milk secretion Consuming as a vegetable for postpartum support
<i>Gynura procumbens</i> (Lour.) Merr.	HNIP/18735	<i>Chau oh mia</i>	Vietnam	Leaf and Bud	Reproductive	Increases milk secretion Consuming as a vegetable for postpartum support
<i>Hedychium coronarium</i> J.Koenig	HNIP/18850	<i>La co pe - te</i>	Vietnam	Whole plant	Reproductive	Bathing as a postpartum tonic
<i>Hedychium flavum</i> Roxb.	HNIP/18851	<i>La co pe - nep</i>	Vietnam	Whole plant	Reproductive	Bathing as a postpartum tonic
<i>Hedychium villosum</i> Wall.	HNIP/18852	<i>Co nong</i>	Vietnam	Rhizome	Gout Pain management	Use to treat gout Use to treat foot pain
<i>Helixanthera parasitica</i> Lour.	HNIP/18785	<i>Dieng seng cha</i>	Vietnam	Leaf, Stem	Pain management Respiratory	Use as a pain reliever Use to treat cough
	WP5526	<i>Dieng seng cha</i>	Thailand	Leaf, Stem	Pain management Respiratory	Use as a pain reliever Use to treat cough
<i>Hellenia speciosa</i> (J.Koenig) S.R.Dutta	WP5423	<i>Sinh quan dieng</i>	Thailand	Stem	Urinary and kidney	Use to prevent kidney disorder
<i>Hemerocallis fulva</i> (L.) L.	HNIP/18768	<i>Ha dia</i>	Vietnam	Leaf	Respiratory	Use to treat cough
<i>Heptapleurum ellipticum</i> (Blume) Seem.	-	<i>U cha phi</i>	Thailand	Leaf, Stem	Reproductive	Bathing as a postpartum tonic
	HNIP/18712	<i>Song phim dieng</i>	Vietnam	Leaf, Stem	Reproductive	Bathing as a postpartum tonic
<i>Homalomena</i> sp.	WP5427	<i>Pang xien mia'</i>	Thailand	Rhizome	Rheumatism	Use to treat rheumatism
<i>Homonoia riparia</i> Lour.	-	<i>Sui liem dieng</i>	Thailand	Leafy branch	Reproductive Rheumatism	Bathing as a postpartum tonic Use to treat rheumatism
	HNIP/18756	<i>Sui liem dieng</i>	Vietnam	Leafy branch	Reproductive Rheumatism	Bathing as a postpartum tonic Use to treat rheumatism
<i>Houttuynia cordata</i> Thunb.	HNIP/18838	<i>Che mua mia</i>	Vietnam	Whole plant	Pain management	Use as a pain reliever
<i>Illigera celebica</i> Miq.	HNIP/18769	<i>Chu tai may</i>	Vietnam	Aerial part	Pain management	Use as a pain reliever
<i>Illigera rhodantha</i> Hance	HNIP/18770	<i>Nhung uan mhay</i>	Vietnam	Aerial part	Reproductive	Use as a postpartum tonic
<i>Iodes cirrhosa</i> Turcz.	HNIP/18772	<i>Huay meng</i>	Vietnam	Leaf and Stem	Pain management	Use as a pain reliever
	WP5442	<i>Bop che may</i>	Thailand	Stem	Musculoskeletal	Use to treat bone fracture Use to treat obstetric disease
		<i>Huay meng</i>	Thailand	Leaf and Stem	Pain management	Use as a pain reliever
		<i>Sung bung mhay</i>	Thailand	Stem	Respiratory	Use to treat cough
<i>Iresine diffusa</i> Humb. & Bonpl. ex Willd. f.	HNIP/18702	<i>Lay len si</i>	Vietnam	Leaf and Stem	Blood and blood vessels Reproductive	Use as a blood tonic Consuming as a vegetable for postpartum support
<i>hebstii</i> (Hook.) Pedersen						
<i>Iris japonica</i> Thunb.	HNIP/18773	<i>Luoi dong</i>	Vietnam	Whole plant	Body strengthens Reproductive	Bathing for health promotion Use as a postpartum tonic
<i>Isodon lophanthoides</i> (Buch.-Ham. ex D.Don) H.Hara	HNIP/18781	<i>Keng pam mia</i>	Vietnam	Whole plant	Footsore	Use to treat footsore
<i>Jasminum</i> sp.	HNIP/18800	<i>Dang meu kong</i>	Vietnam	Leaf and Stem	Body strengthens Reproductive	Bathing for health promotion Use as a postpartum tonic

<i>Justicia ventricosa</i> Wall. ex Nees	HNIP/18695	<i>Tam bung nau</i>	Vietnam	Leaf	Body strengthens Rheumatism	Bathing for health promotion Use to treat rheumatism
<i>Kadsura coccinea</i> (Lem.) A.C.Sm.	-	<i>Kam chin mahy</i>	Thailand	Stem	Pain management	Use to treat leg pain
<i>Lanxangia coriandriodora</i> (S.Q.Tong & Y.M.Xia) M.F.Newman & Škorničk.	HNIP/18840	<i>Kam chin may</i>	Vietnam	Fruit and Root	Tonic	Use as tonic
<i>Lasianthus chrysoneurus</i> (Korth.) Miq.	HNIP/18853	<i>L'co dang</i>	Vietnam	Whole plant	Tonic	Consuming aqueous decoction as tonic
<i>Limnophila rugosa</i> (Roth) Merr.	HNIP/18829	<i>Che guy ziet deng</i>	Vietnam	Leaf and Stem	Body strengthens Reproductive	Bathing for people who recovered from illness Bathing as a postpartum tonic
<i>Liquidambar chinensis</i> Champ. ex Benth.	HNIP/18804	<i>Hoi nuoc</i>	Vietnam	Whole plant	Digestive system Pain management	Use to treat digestive disorders Use as a pain reliever
<i>Litsea cubeba</i> (Lour.) Pers.	HNIP/18701	<i>Ta biu dieng</i>	Vietnam	Root	Rheumatism	Use to treat rheumatism
<i>Lonicera macrantha</i> (D.Don) Spreng.	-	<i>Ta chiem dieng</i>	Thailand	Bark	Skin	Use to treat scabies
	HNIP/18784	<i>Ta cham dieng</i>	Vietnam	Bark	Skin	Use to treat scabies
	HNIP/18741	<i>Hia tra</i>	Vietnam	Leaf, Stem	Skin	Use to treat itchy skin Use to treat rash
<i>Lophatherum gracile</i> Brongn.	HNIP/18809	<i>Ky tau</i>	Vietnam	Aerial part Leaf	Urinary and kidney Injury	Use to treat urinary tract infection Use to stop bleeding
<i>Luculia pinceana</i> Hook.	HNIP/18830	<i>Keng pi dieng</i>	Vietnam	Leaf and Stem	Body strengthens Reproductive	Bathing for people who recovered from illness Bathing as a postpartum tonic
<i>Lycopodiella cernua</i> (L.) Pic.Serm.	HNIP/18787	<i>Dam chau mia</i>	Vietnam	Leaf	Skin	Use to treat itchy skin
<i>Lygodium japonicum</i> (Thunb.) Sw.	HNIP/18788	<i>Cu suy mia</i>	Vietnam	Whole plant	Reproductive	Use as contraception
<i>Macrosolen bibracteolatus</i> (Hance) Danser	HNIP/18786	<i>Deng seng</i>	Vietnam	Leaf and Stem	Tonic	Use aqueous decoction or alcohol-infused remedy as a male tonic
<i>Maesa glomerata</i> K.Larsen & C.M.Hu	HNIP/18818	<i>Deeng tong-hai</i>	Vietnam	Whole plant	Musculoskeletal	Use to treat obstetric disease
	WP5425	<i>Deeng ton g-hai</i>	Thailand	Whole plant	Musculoskeletal	Use to treat obstetric disease
<i>Maesa ramentacea</i> (Roxb.) A.DC.	-	<i>Chan tai cha</i>	Thailand	Leafy branch	Skin	Topical treatment of scabies with aqueous decoction
<i>Malaisia scandens</i> (Lour.) Planch.	HNIP/18757	<i>Dia sieu lau</i>	Vietnam	Leafy branch	Reproductive	Bathing as a postpartum tonic
<i>Mallotus paniculatus</i> (Lam.) Müll.Arg.	-	<i>Ka dat</i>	Thailand	Leaf, Stem	Body strengthens	Bathing for health promotion
	HNIP/18758	<i>Ka dat</i>	Vietnam	Leaf, Stem	Body strengthens	Bathing for health promotion
<i>Melicope pteleifolia</i> (Champ. ex Benth.) T.G.Hartley	HNIP/18832	<i>Puong dia pam</i>	Vietnam	Leaf and Stem	Pain management	Use to treat alleviate pain
<i>Myxopyrum pierrei</i> Gagnep.	no	<i>Deeng ton im</i>	Thailand	NA	Lymphatic disease	Use to treat lymphatic disease
	HNIP/18801	<i>Ha chun dia</i>	Vietnam	Leaf, Stem	Respiratory	Use as a cough remedy Use to treat asthma
<i>Naravelia</i> sp.	HNIP/18821	<i>Dia nhau</i>	Vietnam	Leaf, Stem	Reproductive	Consuming or bathing aqueous decoction as a postpartum tonic
<i>Nekemias cantoniensis</i> (Hook. & Arn.) J.Wen & Z.L.Nie	-	-	Thailand	Leaf and Stem	Digestive system	Use to treat peptic ulcer
<i>Neuropeltis racemosa</i> Wall.	WP5491	-	Thailand	Stem	Tonic	Use as tonic
<i>Ophiopogon caulescens</i> (Blume) Backer	-	-	Thailand	Whole plant	Reproductive	Consuming or bathing aqueous decoction as a postpartum tonic
<i>Oxyspora paniculata</i> (D.Don) DC.	HNIP/18791	<i>Gung xang si</i>	Vietnam	Leaf, Stem	Body strengthens	Use as a bathing remedy for body relaxation
<i>Panax bipinnatifidus</i> Seem.	HNIP/18713	<i>Phan xiet</i>	Vietnam	Root	Tonic	Consuming as tonic Use as tonic
<i>Pandanus</i> sp.	-	<i>Hia lai diou</i>	Thailand	Fruit, Leaf, Stem	Urinary and kidney	Use to treat kidney stone

<i>Paratinospora sagittata</i> (Oliv.) Wei Wang	-	-	Thailand	Tuber	Digestive system	Use to treat stomachache
<i>Paris polyphylla</i> Sm.	HNIP/18790	<i>Pham xiet doi</i>	Vietnam	Rhizome	Injury Tonic	Use to stop bleeding Use as tonic
<i>Pegia sarmentosa</i> (Lecomte) Hand.-Mazz.	-	<i>Chim tau lau</i>	Thailand	Root, Stem, Leaf	Skin	Use to treat skin diseases
	HNIP/18703	<i>Chim tau lau</i>	Vietnam	Root, Stem, Leaf	Skin	Use to treat skin diseases
<i>Persicaria capitata</i> (Buch.-Ham. ex D.Don) H.Gross	HNIP/18814	<i>Nghe hoa dau</i>	Vietnam	Whole plant	Skin	Use to treat tinea
<i>Persicaria chinensis</i> (L.) H.Gross	HNIP/18815	<i>Tau than gung</i>	Vietnam	Whole plant	Detoxification Urinary and kidney	Consuming aqueous decoction as an antidote Use to treat diuretic Use to treat kidney disorders
<i>Persicaria perfoliata</i> (L.) H.Gross	HNIP/18816	<i>Tra lau lo mia</i>	Vietnam	Aerial part	Tonic	Consuming aqueous decoction as tonic
<i>Phlogacanthus curviflorus</i> (Nees) Nees	HNIP/18696	<i>Hung dia dieng</i>	Vietnam	Stem	Musculoskeletal	Use to treat obstetric disease
	WP5460	<i>Hung dia dieng</i>	Thailand	Stem	Musculoskeletal	Use to treat obstetric disease
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	HNIP/18810	<i>Lua ty</i>	Vietnam	Rhizome	Diabetes Urinary and kidney	Consuming aqueous decoction to treat diabetes Consuming aqueous decoction to treat kidney stone
<i>Piper boehmeriifolium</i> (Miq.) Wall. ex C.DC.	-	<i>Phiu hoa</i>	Thailand	Whole plant	Oedema Paralysis	Use to treat oedema Use to treat paralysis
<i>Piper sarmentosum</i> Roxb.	HNIP/18803	<i>Hang chay mia</i>	Vietnam	Whole plant	Digestive system Pain management Rheumatism	Use to treat digestive disorders Use to treat toothache Use to treat rheumatism
<i>Plantago asiatica</i> L.	HNIP/18805	<i>Hang chay mia</i>	Vietnam	Seed Whole plant	Urinary and kidney Body strengthens	Use to treat diuretic Bathing for health promotion
<i>Plantago major</i> L.	HNIP/18806	<i>Hang chay mia</i>	Vietnam	Whole plant	Urinary and kidney	Consuming aqueous decoction to treat diuretic
<i>Poikilospermum suaveolens</i> (Blume) Merr.	-	<i>Puong dia tom</i>	Thailand	Whole plant	Cervical cancer Musculoskeletal Nervous system	Use to treat cervical cancer Use to treat obstetric disease Use to treat epilepsy
<i>Polygala arillata</i> Buch.-Ham. ex D.Don	HNIP/18812	<i>Hia dia ngeng</i>	Vietnam	Root	Insomnia	Use to treat insomnia
<i>Polygala karensium</i> Kurz	HNIP/18813	<i>Ha dia nganh</i>	Vietnam	Root	Blood and blood vessels	Use to treat anemia
<i>Polygonatum punctatum</i> Royle ex Kunth	HNIP/18721	<i>Co phui doy</i>	Vietnam	Rhizome	Musculoskeletal	Use to treat arthralgia
<i>Pothos</i> sp.	HNIP/18710	<i>Ha dia ngeng</i>	Vietnam	Stem	Pain management Respiratory	Use as a pain reliever Use to treat cough
<i>Pycnarrhena poilanei</i> (Gagnep.) Forman	WP5529	<i>Dia chan</i>	Thailand	Stem	Musculoskeletal	Use to treat obstetric disease
<i>Rauvolfia verticillata</i> (Lour.) Baill.	HNIP/18709	<i>San to dia</i>	Vietnam	Entire plant	Skin	Use to treat itchy skin
<i>Reynoutria japonica</i> Houtt.	HNIP/18817	<i>Tra lau lo mia</i>	Vietnam	Whole plant	Tonic	Consuming aqueous decoction as tonic
		<i>Tran tay tra</i>	Vietnam	Leaf, Stem	Strangury	Use to treat strangury
<i>Rhaphidophora decursiva</i> (Roxb.) Schott	-	-	Thailand	Whole plant	Reproductive	Bathing as a postpartum tonic
<i>Rhaphidophora hookeri</i> Schott	-	<i>Dia bay</i>	Thailand	Leaf	Body strengthens	Bathing for health promotion
	HNIP/18711	<i>Dia bay</i>	Vietnam	Whole plant	Reproductive	Bathing as a postpartum tonic
<i>Ricinus communis</i> L.	HNIP/18759	<i>Ma puong dieng</i>	Vietnam	Leafy branch	Urinary and kidney	Use to treat kidney disorders
<i>Rubus alceifolius</i> Poir.	HNIP/18827	<i>Ghim xi</i>	Vietnam	Fruit, Root, Leaf Leaf, Root	Digestive system Digestive system	Use to treat diarrhea Use to treat digestive disorders
<i>Sabia limoniacea</i> Wall. ex Hook.f. & Thomson	HNIP/18836	<i>Dia dan</i>	Vietnam	Leaf and Stem	Body strengthens Detoxification Reproductive	Bathing for people who recovered from illness Bathing for body detoxification Bathing as a postpartum tonic

<i>Sabia parviflora</i> Wall.	-	<i>Dia zan</i>	Thailand	Leafy branch	Rheumatism Body strengthens	Consuming or bathing aqueous decoction to treat rheumatism Use as a hot bathing remedy to treat chronic disease or disorder Use as a hot bathing remedy to strengthen the body Bathing as a postpartum tonic Use to treat rheumatism
	HNIP/18837	<i>Dia zan</i>	Vietnam	Leafy branch	Reproductive Rheumatism Body strengthens	Use as a hot bathing remedy to treat chronic disease or disorder Use as a hot bathing remedy to strengthen the body Bathing as a postpartum tonic Use to treat rheumatism
<i>Sambucus javanica</i> Reinw. ex Blume	HNIP/18700	<i>Tung de</i>	Vietnam	Leaf, Stem	Reproductive Rheumatism Body strengthens Musculoskeletal	Use to treat rheumatism Fatigue treatment Use to treat a sprain
<i>Sarcandra glabra</i> (Thunb.) Nakai	HNIP/18743	<i>Dia san</i>	Vietnam	Whole plant	Digestive system	Use to treat stomachache
<i>Saxifraga stolonifera</i> Curtis	HNIP/18839	<i>Chiep chang mia</i>	Vietnam	Whole plant	Tonic	Use as tonic
<i>Scoparia dulcis</i> L.	HNIP/18807	<i>Mia nom muon</i>	Vietnam	Root	Respiratory	Consuming aqueous decoction to treat fever with cough
<i>Scrophularia ningpoensis</i> Hemsl.	WP5517	<i>Mia nom muon</i>	Thailand	Root	Reproductive	Use to treat menstrual disorders
	HNIP/18843	<i>Dia sam</i>	Vietnam	Root	Digestive system	Use to treat diarrhea Use to treat digestive disorders
<i>Senna hirsuta</i> (L.) H.S.Irwin & Barneby	HNIP/18761	<i>Deng tap</i>	Vietnam	Leaf	Tonic	Use as tonic
<i>Smilax gagnepainii</i> T.Koyama	HNIP/18844	<i>Chim dang kung</i>	Vietnam	Leaf and Stem	Digestive system	Use to treat diarrhea Use to treat digestive disorders
<i>Smilax glabra</i> Roxb.	HNIP/18845	<i>Chim dang ngoy doy</i>	Vietnam	Rhizome	Dysentery	Use to treat dysentery
<i>Solanum incanum</i> L.	HNIP/18846	<i>Chia gim</i>	Vietnam	Fruit and Thorns	Pain management	Use to treat toothache
<i>Spatholobus suberectus</i> Dunn	HNIP/18762	<i>Chim chung mahy</i>	Vietnam	Leaf, Stem	Tonic	Use as tonic
<i>Stauntonia chinensis</i> DC.	HNIP/18783	<i>Diang nai may</i>	Vietnam	Whole plant	Body strengthens Reproductive	Bathing for health promotion Use as a postpartum tonic
<i>Stauntonia grandiflora</i> (Réaub.) Christenh.	HNIP/18782	<i>Dang nai may</i>	Vietnam	Whole plant	Tonic	Use as tonic
<i>Stemona tuberosa</i> Lour.	HNIP/18847	<i>Chiep nhi mua doy</i>	Vietnam	Root	Respiratory	Use as a cough remedy
<i>Stephania brachyandra</i> Diels	HNIP/18795	<i>Keng chin doi</i>	Vietnam	Tuber	Skin	Use to treat ring worm
<i>Tacca chantrieri</i> André	WP5421	<i>San ta uang</i>	Thailand	Leaf, Root Root	Anthelmintics Gastric ulcer Tonic	Use as anthelmintic Use to treat gastric ulcer Use as tonic
<i>Tadehagi triquetrum</i> (L.) H.Ohashi	HNIP/18763	<i>Ha ngeng dia</i>	Vietnam	Whole plant	Musculoskeletal	Use to treat obstetric disease
	WP5459	<i>Ha ngeng dia</i>	Thailand	Whole plant	Musculoskeletal	Use to treat obstetric disease
<i>Talinum paniculatum</i> (Jacq.) Gaertn.	HNIP/18848	<i>Ka li sun</i>	Vietnam	Whole plant	Body strengthens Reproductive	Consuming for people who recovered from illness Consuming for health promotion in postpartum support
<i>Tetradium ruticarpum</i> (A.Juss.) T.G.Hartley	HNIP/18833	<i>Che guy mia</i>	Vietnam	Leaf	Tonic	Use as tonic
<i>Tetrapanax papyrifer</i> (Hook.) K.Koch	HNIP/18714	<i>Dia thong</i>	Vietnam	Leaf	Infectious disease	Use to treat infectious disease
<i>Tetragium cruciatum</i> Craib & Gagnep.	WP5407	<i>Keng thiu mia</i>	Thailand	Leaf and Stem	Irritation Skin	Use to treat irritation Use to treat itchy skin Use to treat skin diseases

<i>Tetrataenium bivittatum</i> (H.Boissieu) Manden.	HNIP/18708	<i>Lay chan bua</i>	Vietnam	Tuber	Tonic	Use as tonic
<i>Thalictrum ichangense</i> Lecoy. ex Oliv.	HNIP/18822	<i>Keng chin mia (Loi nep)</i>	Vietnam	Leaf, Root	Skin	Use to treat itchy skin
<i>Thunbergia grandiflora</i> Roxb.	WP5522	<i>Dia ha may</i>	Thailand	Leaf, Stem	Musculoskeletal	Use to treat obstetric disease
		<i>Die hai may</i>	Thailand	Stem	Detoxification	Use as drugs or alcohol detoxification
		<i>Die le may</i>	Thailand	Leaf and Stem	Detoxification	Use as body detoxification
					Injury	Use to treat a wound
					Musculoskeletal	Use to treat obstetric disease
<i>Tinospora crispa</i> (L.) Hook.f. & Thomson	WP5432	<i>Hau nhang dia</i>	Thailand	Stem	Digestive system	Use to treat stomachache
					Musculoskeletal	Use to treat bone fracture
<i>Tradescantia zebrina</i> Bosse	HNIP/18745	<i>Sa phan xi</i>	Vietnam	Whole plant	Body strengthens	Use in cool medicine remedy
					Reproductive	Consuming aqueous decoction or as a vegetable for postpartum support
<i>Trevesia palmata</i> (Roxb. ex Lindl.) Vis.	WP5456	<i>Song phim dieng</i>	Thailand	Stem, leaf, flower	Body strengthens	Bathing for health promotion
<i>Turpinia pomifera</i> (Roxb.) DC.	WP5404	<i>Peu bung mia</i>	Thailand	Leaf, Stem	Musculoskeletal	Use to treat bone fracture or osteoarthritis
<i>Uncaria scandens</i> (Sm.) Wall.	HNIP/18831	<i>Ghim tiu</i>	Vietnam	Stem	Pain management	Use to treat body pain
						Use to treat chest pain
					Reproductive	Use as a postpartum tonic
<i>Urena lobata</i> L.	HNIP/18789	<i>Mia con chien</i>	Vietnam	Root	Digestive system	Use to treat diarrhea
					Injury	Use to treat wound sfrom thorn stab
					Reproductive	Use to increase infertility
<i>Ventilago diffusa</i> (G.Don) Exell	HNIP/18824	<i>Dia uy, Tam kha may</i>	Vietnam	Leaf and Stem	Blood and blood vessels	Use as a blood tonic
<i>Wurfbainia aromatica</i> (Roxb.) Škorničk. & A.D.Poulsen	HNIP/18854	<i>La hao</i>	Vietnam	Fruit	Digestive system	Use to treat digestive disorders
					Fever and flue	Use to treat flu
					Respiratory	Use to treat cold
<i>Zanthoxylum asiaticum</i> (L.) Appelhans, Groppo & J.Wen	HNIP/18834	<i>Thuoc tam</i>	Vietnam	Leaf	Body strengthen	Fatigue treatment
<i>Zanthoxylum scandens</i> Blume	HNIP/18835	<i>Thuoc tam</i>	Vietnam	Stem	Body strengthen	Bathing for health promotion
<i>Zea mays</i> L.	HNIP/18811	<i>Thuoc tam</i>	Vietnam	Style	Respiratory	Use as a cough remedy
					Urinary and kidney	Use to treat kidney stone
						Use to treat urinary tract infection
<i>Zingiber officinale</i> Roscoe	-	<i>Sung</i>	Thailand	Leaf Rhizome	Body strengthen	Bathing for health promotion
					Digestive system	Use as antiemetic medicine (consumed as a food ingredient)
						Use as a digestive enhancer supplement
	HNIP/18855	<i>Sung</i>	Vietnam	Whole plant	Body strengthen	Bathing for health promotion
					Digestive system	Use as antiemetic medicine (consumed as a food ingredient)
						Use as a digestive enhancer supplement
<i>Ziziphus attopensis</i> Pierre	HNIP/18825	<i>Lom tiet g-him</i>	Vietnam	Leaf, Stem	Cervical cancer	Use to treat cervical cancer
					Musculoskeletal	Use to treat obstetric disease
	WP5406	<i>Lom tiet g-him</i>	Thailand	Whole plant	Cervical cancer	Use to treat cervical cancer
					Musculoskeletal	Use to treat obstetric disease

Discussion

Diversity of medicinal plant use among the Mien people

The study presents a comprehensive catalog enumerating 199 medicinal plant species utilized by the Mien communities in Thailand and Vietnam, a tally that aligns closely with the number of species reported in extant ethnobotanical research within the region (Van On et al. 2001; Panyaphu et al. 2011; Sam 2012). This affirms the pivotal role of ethnomedicine in these communities, particularly in areas where modern healthcare is less accessible (Hussain et al. 2023; Magtalas et al. 2023). The importance of documenting this traditional knowledge is twofold: it supports ongoing healthcare practices and contributes to the safeguarding of Mien cultural heritage (Dutta et al. 2021). However, it is noteworthy that our study identified fewer species than research conducted in China, where over 300 species were reported (Luo et al. 2018; Lu et al. 2022). This discrepancy may be due to the larger sample sizes and proximity to medicinal markets in the Chinese studies. Additionally, previous studies on the ethnobotanical use of local vegetables in Thailand suggest that the diversity of reported plant use is positively correlated with the number of studies conducted (Panyadee et al. 2023), which might also explain some of the variation in species numbers. Future research may benefit from increasing sample sizes for a more exhaustive cataloging of medicinal plants.

The disparity in the utilization of medicinal plants between Mien communities in Thailand and Vietnam is striking, with 161 species being documented in Vietnam as opposed to a comparatively modest 79 species in Thailand. This numerical discrepancy is statistically significant and invites further scrutiny of the underlying causative factors. However, it is pertinent to acknowledge the methodological limitations of this study, primarily in terms of the restricted geographical scope of our field sites. Consequently, it is not feasible to definitively ascertain the principal factors contributing to this variation within the bounds of this research. The phenomenon could partially be explained by the erosion of traditional ethnomedicinal knowledge within Mien communities in Thailand (Srithi et al. 2009). This observed degradation of traditional wisdom corroborates the urgency underpinning the study's objective: to document extant traditional knowledge before its complete disappearance. The erosion of traditional knowledge in Thailand could therefore be a pivotal factor influencing the diminished range of medicinal plants utilized when contrasted with Vietnamese Mien communities. This erosion can be attributed to various factors, such as economic marginalization and land loss, which contribute significantly to the decline of traditional knowledge and practices (Srithi et al. 2009). These challenges have a direct impact on the ability of communities to sustain and pass on their ethnobotanical wisdom, leading to a narrower range of medicinal plants being used.

In light of these considerations, we advocate for additional comparative studies that span multiple nations. Such cross-country research endeavors are not merely an academic exercise; they are instrumental for a nuanced understanding of ethnomedicinal practices, factors

influencing knowledge erosion, and the concomitant implications for biodiversity conservation and cultural heritage. Such studies would significantly augment the existing body of knowledge and offer empirical data to validate or refute the preliminary findings of this research.

The trend of plant uses

This study was carried out independently in Thailand and Vietnam, focusing on the Mien communities in both countries. The methodological independence of the study sites serves to highlight the robustness of our comparative analysis, enabling us to isolate the impact of geography on ethnobotanical knowledge. Our findings demonstrate that geographical variation significantly impacts the diversity and selection of medicinal plant species, confirming earlier research by Inta et al. (2023). This geographical influence is not merely superficial; it deeply shapes the local pharmacopoeias. Here, it is crucial to note that the local environment and the availability of specific plant species significantly influence ethnobotanical knowledge (Beltrán-Rodríguez et al. 2014; Quave and Pieroni 2015; López-Patiño et al. 2022). The availability of different plant species, each with unique chemical compounds and medicinal properties, further nuances this traditional knowledge (Az-Zahra et al. 2021).

Additionally, the geographical differences between our study areas in Lao Cai province of Vietnam and Nan province of Thailand, which belong to the subtropical and tropical climate belts respectively, have a pronounced effect on biodiversity. This variation in biodiversity inevitably influences the choice of plant species used medicinally. Despite these climatic differences, there are notable similarities in many plant species used by the Mien communities in both locations. Such similarities can be attributed to the shared ancient source of their ethnobotanical knowledge. Even after migrating in different directions, the Mien people have retained this traditional identity, underlining the deep-rooted and enduring nature of their medicinal plant practices.

Our study demonstrates notable patterns in plant part preferences and healthcare categories across geographically independent Mien communities in Thailand and Vietnam. Despite these geographical variances, a marked degree of similarity was observed in the choice of plant parts—such as leaves, stems, and whole plants—utilized for medicinal applications. This congruence extends beyond the Mien communities, resonating with plant part preferences observed among other ethnic groups in the region. For example, leaves are recurrently cited as the most favored plant part, owing to their ease of harvest and concentration of bioactive compounds (Yemele et al. 2015; Asowata-Ayodele et al. 2016; Phumthum et al. 2018). The inclination towards utilizing whole plants often correlates with the predominance of herbaceous plants in the local pharmacopeia, which are simpler to harvest in their entirety. Conversely, the preference for stems is frequently associated with woody plants. Thus, it can be inferred that the pattern of plant part preference in the Mien communities may not be exclusive to them but likely reflects a broader regional trend. Significantly, the proclivity for leaf usage extends beyond

medicinal applications, encompassing their incorporation as food sources (Panyadee et al. 2022, 2023), thereby amplifying their ethnobotanical relevance.

Our study further elucidates the remarkable uniformity in the categories of medicinal plant applications across the Mien communities in both Thailand and Vietnam. One area where this consistency is particularly salient is in the use of medicinal plants for bathing, with an emphasis on applications such as postpartum care, body wellness enhancement, and musculoskeletal health management. Notably, the significance of medicinal baths for postpartum care has been documented in Mien communities in both Thailand (Panyaphu et al. 2011) and Vietnam (Phíp et al. 2009). Intriguingly, research conducted in China offers a different vantage point on the therapeutic applications of medicinal plants by local healers. Specifically, Lu et al. (2022) found that traumatic injuries and orthopedic issues were the most commonly treated conditions. Furthermore, Luo et al. (2018) revealed that in Chinese Mien medicinal markets, the plants most frequently sold were those used for treating rheumatism and clearing inner heat. These regional variations point to the adaptive nature of ethnobotanical practices among the Mien people, influenced by both local healthcare needs and the availability of specific medicinal plants. In a broader context, it is noteworthy that other ethnic groups—such as the Karen, Lahu, and Lisu (Inta et al. 2023)—also place significant emphasis on bathing medicine, particularly for postpartum care. This shared ethnomedical focus could be attributed to a combination of factors, including linguistic commonalities that facilitate the transmission of traditional knowledge, similar socio-cultural beliefs surrounding maternal health, and perhaps a common ancestral lineage that carried these practices across different ethnic groups.

Bathing medicine involves the use of diverse specific plant species decocted in water to create medicinal solutions ideal for bathing. Notably, the skin's expansive surface area allows for the effective absorption of medicinally beneficial compounds during these baths (van Tubergen and van der Linden 2002; van't Klooster et al. 2018; Silalahi and Nisyawati 2019). The heated water also aids in dilating blood vessels and lymphatic channels, thus enhancing circulation and metabolic processes (van Tubergen and van der Linden 2002). The Mien community adopts a flexible approach to these baths, lacking fixed formulas or specific quantities of plant materials. Instead, they opt for combining plants with synergistic therapeutic properties to amplify the baths' effectiveness. These medicinal baths represent a holistic approach to health (Li et al. 2006) and are deeply ingrained in Mien cultural traditions (Luo et al. 2018). They serve a multitude of purposes, including relaxation and infection prevention, offering an economical and culturally meaningful alternative or complement to contemporary medical treatments, thereby highlighting the richness and utility of Mien ethnomedical practices.

Updating ethnobotanical knowledge: Contemporary studies of the Mien in Southeast Asia

Despite the rich ethnobotanical history of the Mien people in regions outside China, a notable concern is that

nearly all published studies date back over a decade (i.e. Van On et al. 2001; Li et al. 2006; Yuyun 2006; Phíp et al. 2009; Srithi et al. 2009; Panyaphu et al. 2011; Sam 2012; Srithi et al. 2012). This temporal gap raises questions about the current relevance and applicability of the documented knowledge. Over time, traditional practices can evolve, diminish, or even disappear, especially in the face of rapid socio-economic changes, globalization, and environmental pressures (Sujarwo et al. 2014; Hedges et al. 2020; Mattalia et al. 2021). This lapse in recent research may mean that crucial developments in Mien ethnobotanical practices, potentially influenced by modernization or environmental changes, remain undocumented and unanalyzed.

The current study addresses this critical gap by providing updated insights into the Mien communities' ethnobotanical knowledge and practices in Thailand and Vietnam. By conducting recent fieldwork and interviews, this research captures the contemporary state of Mien ethnobotanical knowledge, considering any shifts or continuities since the last studies. This updated understanding is vital for several reasons. Firstly, it offers a current view of the Mien's interaction with their environment, which is essential for the conservation and sustainable use of local plant species (Casas et al. 2016; Suwardi et al. 2020; Dutta et al. 2022). Secondly, it allows for the identification of any new medicinal plants or uses that have emerged, potentially contributing to the global pool of medicinal knowledge (Süntar 2020; Porras et al. 2021). Finally, understanding the current state of Mien ethnobotanical practices is crucial for developing strategies to preserve their traditional knowledge, especially in a rapidly changing world where such knowledge is increasingly at risk of being lost (Tengö et al. 2014; Cuerrier et al. 2015). This study, therefore, not only contributes to the academic field of ethnobotany but also serves a crucial role in the conservation and appreciation of traditional medicinal practices.

In conclusion, this study underscores the importance of preserving traditional knowledge and the potential of traditional medicine in enhancing healthcare in rural communities. Investigating the diverse medicinal plant use among the Mien people in Thailand and Vietnam, it recorded numerous species, notably used for various health-related purposes. The study highlights a trend in the usage of plant parts like leaves, stems, and roots, and a significant correlation in preferences and health categories across both countries, reflecting a shared ethnomedicinal practice. By emphasizing the role of ethnomedicinal studies in biodiversity conservation, drug discovery, and healthcare improvement, the study paves the way for further research. It includes exploring the active compounds in these plants and their therapeutic effects, and expanding the investigation to other ethnic groups' medicinal plant knowledge in the region. Future research should also emphasize collaboration with local communities and traditional healers for sustainable use and conservation of medicinal resources. Such efforts are essential for integrating traditional medicine into modern healthcare systems, offering a rich potential for new drug development and enhancing healthcare practices in rural settings. Additionally, considering the intriguing aspects of cultural adaptation and its impact on medicinal

practices, further studies are suggested to investigate if and how the Mien community's use of medicinal plants has evolved post-migration, particularly in response to changes in regulation, lifestyle, and income after settling in Thailand and Vietnam. This could offer valuable insights into the adaptability and evolution of traditional medicine within changing socio-economic environments. Another promising area for future research is the exploration of the historical roots and migrations of the Mien people in China before their spread to Thailand and Vietnam. Understanding the shared origins and cultural connections of the Mien communities, along with the transmission of ethnobotanical knowledge through their migration, could significantly enhance our understanding of their unique cultural identity and traditional practices.

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