Studying Orchids, Enriching Lives

Local women conducting wild orchid research to strengthen the conservation of orchids in Kheshorter and Thaw Thi Pwoghaw community forests, Mutraw District, Salween Peace Park

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Acknowledgements

This research was conducted to investigate the richness of wild orchid in Salween Peace Park in Kawthoolei (Karen) State, Thai Myanmar Border. The project and report have been jointly implemented by KESAN women research team, local Karen Indigenous Knowledge experts, and the Kawthoolei Forestry Department office in Mutraw District, Northern Karen State. The field surveys were conducted independently by the Karen Environmental and Social Action Network, field staff, and facilitated by KESAN members in the field, Kawthoolei Forestry department, and local people in SPP. Training, technical support and field work costs were provided by KESAN.

The KESAN women research team would like to thank all of the people who assisted with this research. In particular, a Kasetsart University staff who helped with species identification and Lynn Vasey, who provided significant help with comments and proof reading. Several anonymous reviewers in the U.S. provided valuable proofreading.

Finally, we must give our greatest thanks to the residents from many villages located around Kheshorter, Thawthee Pwor Ghaw and other community forests, who shared their time, knowledge, experience and homes with us while we recorded our findings.

Summary

This Karen language report details the orchid research led by the indigenous Karen women in the community with assistance from KESAN's Women's Research Group. The research was conducted in two community forests, Kheshorter and Thawthee Pwawghaw, in the Salween Peace Park. By using their indigenous knowledge, the Women's Research Group documented 121 species of orchids from 37 families, with 1 species on IUCN- VU, 1 species on CITES Appendix I list with many other species on IUCN list which 114 species are listed in CITES Appendix II, the species that are prohibited on international trade. However, only 6 species were not found under these lists.

This report aims to increase the Karen peoples' knowledge of various types of orchids that inhabit both their community and other areas, and increase environmental and cultural knowledge among the Karen community, such as basic good governance for the environment, forest, ancestral land, livelihood, culture, and self-determination. Finally, this report also aims to encourage more community-based biodiversity and cultural research.

1. Introduction

After fifteen years of wildlife research and conservation activities within Karen State (Kawthoolei) Burma, we experienced environmental problems coming our way in different shapes and forms. These problems include the illegal extraction of wildlife and wild plants from the communities' forests. Since 2012, when the ceasefire agreement between the Karen rebel group (KNU) and the Burma government had been negotiated, the threats to this extraction of wild orchids started. Wild orchids' illegal extraction and trafficking to neighboring states' residents, especially Karenni State, is particularly a major problem for the indigenous Karen people within Mutraw District or (SPP) discussed with encountered traders. Phelps J (2015) indicated that the illegal wild orchid trade routes predominately come from Kawthoolei to Thailand and enter Bangkok, the capital city of Thailand, from different means of transportation and routes.

The Salween Peace Park particularly faced a major problem as it is located at the Thai-Burma border, and illegal trading routes were shorter especially to Thailand. However, wild orchids are the traditionally protected species for trade, as indigenous Karen people believe they are the spirits of women and rice. Up to this date, there has been no law enforcement known against the illegal wild orchid trade because it had never occurred before. Furthermore, this forest site has been identified based on current knowledge of orchid diversity, and previous extended data had been considered insufficient. Since time immemorial, the assessment of wild orchid compositions, or any wild orchid survey in this forest has never been conducted. Therefore, knowledge of the wild orchid composition and richness of these forests was largely lacking.

1.1. How did the wild orchid research come about?

The research of wild orchids was suggested by the local villagers as they became aware of the illegal wild orchid trade within their territories and that it was unstoppable after the ceasefire agreement reached between Karen Rebel and the Burmese Government. The people from the different cities and states had better access to the areas, which resulted in the introduction of illegal wild orchid trade. The villagers had requested our wildlife research team to cooperate with them to solve this problem because the trading of wild orchids was against their traditional taboo and religious practices. Under this difficult situation the villagers had requested several meetings with our research team to help them conduct wild orchid survey within their territories which they believed could lead to the solution of the wild orchid trade through policy establishment and law enforcement. However, the limited funding and human resources were particularly challenging to conduct this survey. Finally, with their agreement to voluntarily assist our team with both additional food supplies and manpower, our team agreed to cooperate with them to make the survey happen. After that, we conducted several meetings with different villages to seek their cooperation. As a result of many meetings, the wild orchid survey activities were carried out in their territories.

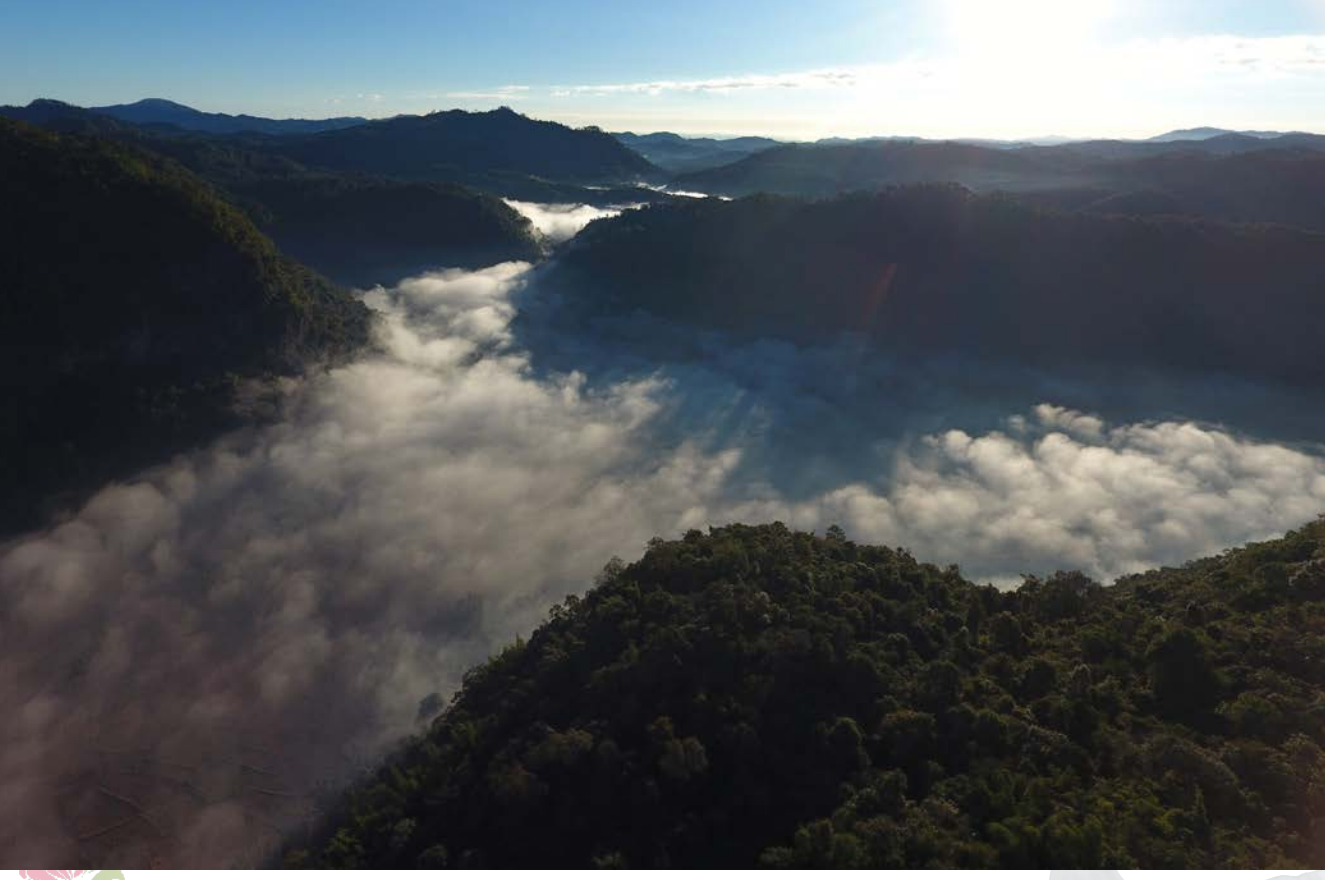
This research was conducted to record wild orchid richness and threats to wild orchid and ethno-orchid species in this territory. The research aims to promote wild orchid species conservation within Salween Peace Park. The objectives of the research are i. To record the wildlife orchid species composition in different forest types of Salween Peace Park, ii. To identify different threats to the wild orchids and ethno-orchid species in SPP, iii. To evaluate the recorded species pertaining to which categories they fall under in IUCN Red List status and CITES appendix, and iv. To examine the traditional wild orchid uses, conservation knowledge and conservation actions taken by the indigenous Karen of Salween Peace Park.

2. Background

2.1 History of Salween District during British Colonial Government

Salween Peace Park was once called Salween District by the British Colonial Government with an area of 2,666 square miles[1]. This District was the most unique because of the religious practices in territories which had already been governed by Karen indigenous communities. Each community had its own customary land, which they managed by zoning areas. These customary lands called (*Kaw*) belong to specific villages or communities inherited by their ancestors. The British Colonial Government faced a lot of challenges dealing with the issue related to (*Kaw*) (Paul et.al, 2020) especially during extraction of teak wood from the territories. In one case, for example, *Pawkader* villagers protested against the cutting of their umbilical cord "human spiritual tree" forest (Day Paw Law) (Paul et.al, 2020) in 1888 resulted in Kaw title granting of the whole Salween District said, "Saw Thaw Gay Say" a community leader. It had happened when the government officers planned to cut down a spirit forest (Day Paw Law) (Paul et.al, 2020) of Pawkader village territory. However, the village defense leader, Saw Thue Heh together with his villagers, used spears and knives to defend that sacred forest. Later, the government officers went to their territories and planted thousands of trees to placate them. However, the villagers, together with Saw Thu Heh, uprooted all the artificially introduced trees and said the spirits did not like "man-made" trees.

1 https://myanmar-law-library.org/IMG/pdf/salween_district_volume_-a.pdf



Salween Peace Park

Salween Peace Park was established in December 2018 by the Karen Indigenous People of Karen State (Kawthoolei) with the aim to revitalize Karen culture, enhance peacebuilding and promote biodiversity conservation using their own indigenous education and traditional knowledge. The Salween Peace Park, formerly called Salween District, Karen State Burma is situated at the heart of the Indo-Burma Hotspot[2]. As Burma is one of the Southeast Asian countries located within tropical zones, many important megafaunas and mega flora species are restricted in this area.

Since 2012, the process of the decision that led to the establishment of SPP within the customary land areas comes from the root of strengthening the community's sovereignty over access to and production of food and natural resources. The steady re-demarcation of ancestral Kaw territories has allowed villages to strengthen the management of their natural resources and broadened knowledge of local taboos and norms, which encourage sustainable use.

2 https://intercontinentalcry.org/indigenous-peoples-officially-launch-the-salween-peace-park/

This has also made it easier for communities to implement inter-Kaw activities such as fish conservation zones, wildlife conservation zones, and community forests that help them maintain a diverse diet. So, the formation of a General Assembly, guided by a community- approved Charter, has created and revitalized a democratic forum that allows communities to learn from one another, and to steer their vision for a peaceful and sustainable future. The General Assembly also provides a strong support network for communities to turn to in times of want and engenders greater resilience to external threats.

This initiative creates a chance for these communities, who have fought to maintain their indigenous practices in the face of conflict, illicit extractive industries, and Burmese government laws that refuse to recognize their rights. The Salween Peace Park represents a real chance for them to build a stable and peaceful life on their own terms. The establishment of the SPP has allowed communities to build on the methods of food sovereignty and biocultural conservation that they have practiced for generations and has started the process of re-opening space for those communities displaced by the conflict to return to their ancestral territories and reconnect with their homelands.

Ingrained in every facet of this self-strengthening endeavor is the deep desire of the SPP's indigenous Karen to preserve and revitalize their socioecological system so that they may continue to live in harmony with their ancestral territory of life. This was successfully introduced in the SPP because traditional customary land governance is based on taboos and an unwritten code of law, which are deeply embedded in the hearts of the Karen people. These land governance practices existed long before modern civil government was established in Burma.

People of Salween District

Salween Peace Park is the territory of life and food sovereignty for the Indigenous Karen People. In the lush, forested hills and free-flowing rivers of Mutraw District Indigenous Karen communities continue to pursue their traditional biocultural practices. Rooted in the very soil, flora, and fauna, the spiritual beliefs, cultural practices, and livelihoods of local Karen communities have been indistinguishably intertwined with their homeland for over 2,700 years. For these communities,

their own health directly corresponds with the landscape around them, and the conservation of and sustainable coexistence with the surrounding environment is a way of life.

Indigenous Karen in the SPP have traditionally practiced both upland *Ku* cultivation and wet paddy farm cultivation, primarily growing rice for consumption. They feel uprooted without lands. Many families also support their subsistence with fruit orchards and through collecting non-timber forest products, including bamboo shoots, mushrooms, honey, and various varieties of ginger, edible ferns, and root vegetables. Other products, such as wild herbs and spices, (Cardamom, chili, sesame oil), elephant foot yams, nuts, rattans, and forest honey, are traded both within the SPP and to communities outside its borders. This system of trade offers households a degree of resilience in times of need. To ensure that a robust agricultural ecosystem is maintained, villages practice seed-sharing, maintaining a broad variety of rice species and other crops to guard against disease. Many villages have also revitalized the practice of rice banks to support those who do not have secure access to food, and as the contingency in cases of natural disaster, poor yield, or external threats. For biomass energy sources and light, pine oil, Dipterocarpus trees oil, and honey wax are used.

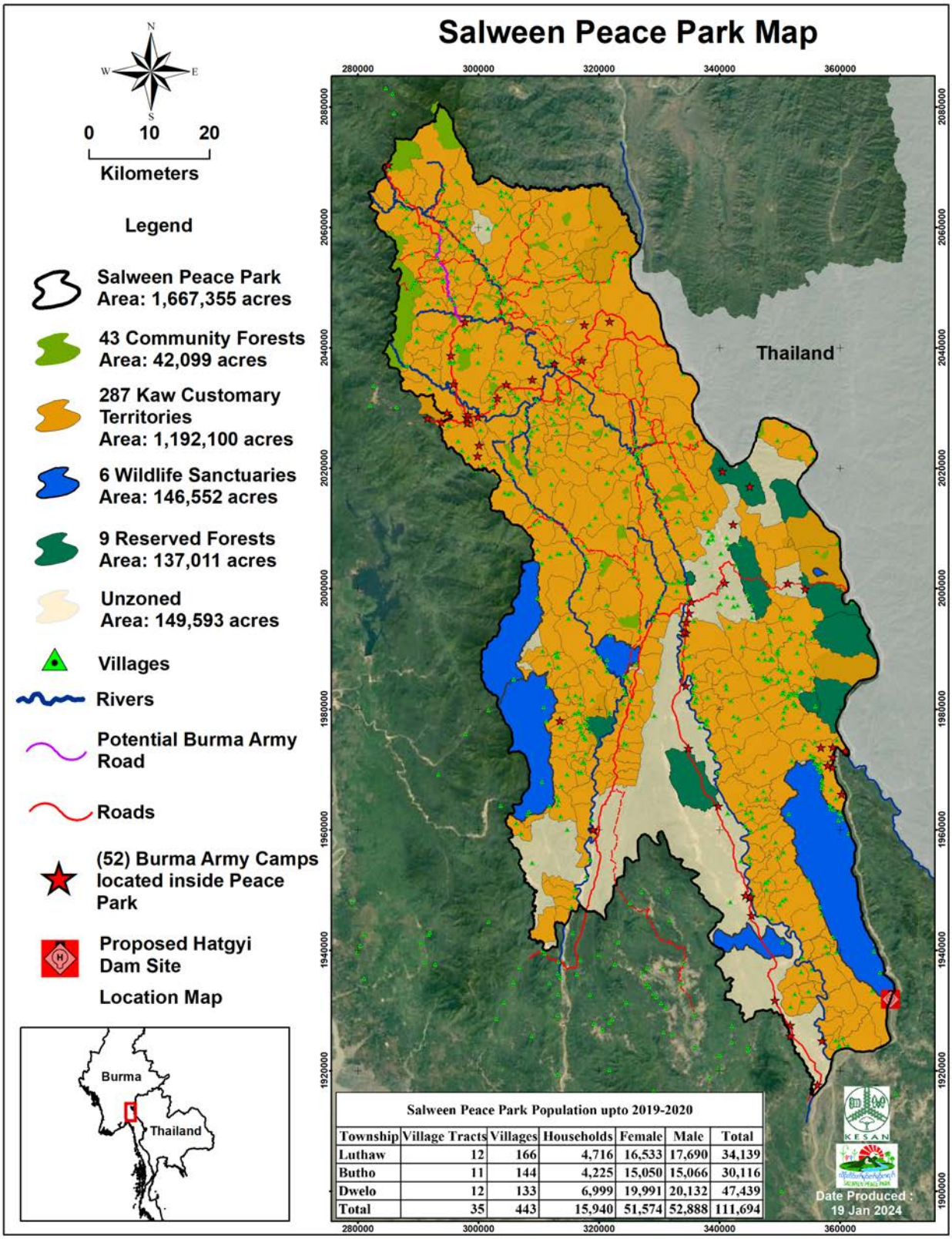
Ecosystem of Salween Peace Park

The ecosystem types from this park can be classified as terrestrial and lotic ecosystem types. The terrestrial habitat types are made up of Montane Evergreen Forest types, Pinus Forest Types and Mix-deciduous Forest Types. Montane Evergreen forest types are famous for agarwood (*Aquilaria malaccensis*) tree species, Pinus Forest, which dominated species is Pinus *Kesiya*, and *Cycas pectinata*, which are often seen in this type of forest. Again, Mix-deciduous Forest types comprised of valuable hardwood trees including rosewood, iron wood, and teak. All these types of forests maintain their areas that are in the primary stage, which are intact and full of giant trees; however, forest types are described in detail in the study area section. These important terrestrial forest types hosted many important wild orchid species.

Karen Mythical history about wild orchid

The history behind the sacred wild orchid came from a story of a beautiful lady who remains single until the end of her life. She was considered the most beautiful woman in the community. Many young men fell in love with her. She tried her best to make all the young men happy, but she was never successful. Finally, she decided not to marry anyone but remain single to make all men satisfied. Before she died, she made a promise to the lord of reincarnation that she wanted to reincarnate again in this world after death as flowers for all people to enjoy, kiss, and love. However, no one was allowed to trade them for money or goods or destroy them because local people believe that they are both the spirit of women and rice. If people trade flowers, the trading of humans will have occurred as well, and the spirit of rice will abandon the community. Similarly, the last name of women is mostly called "Paw" which means orchid, and the place where people store rice or rice barn is also called "Paw". Therefore, the belief of orchid as a sacred species comes from this mythical history of Karen people told by "Naw Yin Shwe".

Salween Peace Park Map



Salween Peace Park Population upto 2019-2020

Township	Village Tracts	Villages	Households	Female	Male	Total
Luthaw	12	166	4,716	16,533	17,690	34,139
Butho	11	144	4,225	15,050	15,066	30,116
Dwelo	12	133	6,999	19,991	20,132	47,439
Total	35	443	15,940	51,574	52,888	111,694

2.2. Kheshorter- Thawthee-Pwor Gaw Community Forests Orchid benefit

The local women are very fond of wild orchids and use them whenever they find one.

Again, when the detailed uses of each species to treat diseases were investigated, it showed that 8 species are used for medicine to treat the common cold by combining it with other products for drinking, 20 species of flowers boiled with Shikakai, reetha and turmeric root for traditional shampoo and ornamental uses, 3 species are used to treat broken bones, and bone and joint injuries, 1 species traditionally treated ear infection, 1 species is used to mark the season for farming, and 53 other species are used in a variety of ways, but particularly for ornamental uses.

The species of wild orchids that are used as food are not consumed with rice in a meal, but as tea. The flowers of wild orchids are picked up and dried to preserve them for long-term use. Then, after all the flowers are dried, a small amount is picked, and mixed with a little salt, or drunk as plain tea.

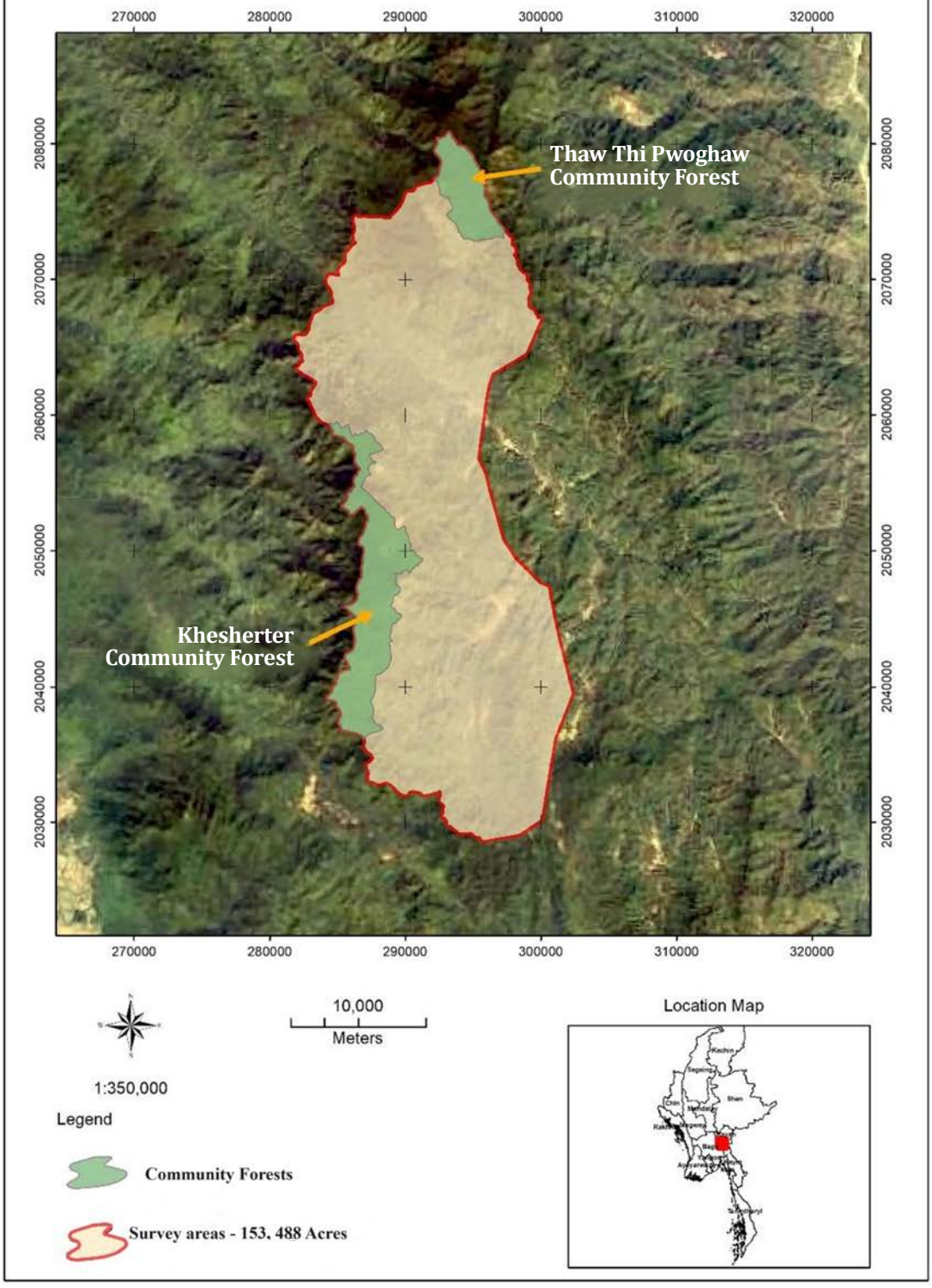
Also, they prepared the orchids to use them for herbal medicine in many ways. Some boiled them with ginger, honey, and salt to treat common cold, while others mixed dried flower with honey and ginger to drink them like tea, according to Naw Lily, a local herbalist.

The use of orchid species provides benefits, but the orchid itself is considered sacred, so all species are important to the Indigenous Karen People of Salween Peace Park. So, having the orchid remain in the forest symbolizes saving women from trafficking and keeping them in their traditional lands, and allowing rice to remain with communities for prosperity and harmony. The species of *Paphiopedilum villosum* is used to treat ear infections by boiling raw flowers for hours, filtering the water carefully then using them as ear drops.

The leaves of some species of the orchid were used to wrap food and materials. The special thing about the wild orchid species leaves is that they are often used by young children in learning how to braid ropes, weaving on a loom, and weaving baskets. Children sometimes use them as hair decoration artificially extending their braided hair.

Again, in the old days, villagers from Salween Peace Park never bought anything from the city except salt, so they used wild orchids for perfume and ornamental purposes. They made their own shampoo by boiling the flower from different orchids with shikakai, reetha turmeric root, tree barks, and other herbal plants for traditional shampoos. They also used flowers during traditional events such as weddings, traditional festivals, and wrist tying blessing ceremonies to wear them as garlands and home decorations. They also planted these different kinds of orchids on their fruit trees, such as mango trees, jack fruit trees, and other fruit trees in their backyard.

Khesherter and Thaw Thi Pwoghaw Community Forest



2.3. Threat to wild orchid

The illegal wild orchid trade is one of the transnational crimes where its product makes up 95% of all species listed by the Convention on the International Trade in Endangered species CITES (Hinsley et. al, 2015). As a result, overharvesting of wild orchids for the Chinese market has been recorded within China itself as well as in neighboring countries commonly traded genera Dendrobium, Paphiopedilum, and Habenaria (Williams et.al 2018).

In China, wild orchids are traded in many marketplaces, including the Yunnan Province bordering Burma, which is famous for its unsustainable harvesting due to the high demand for the ornamental wild orchid species. The price is one of the issues that increases wild orchid trade because the wild orchid species are less expensive than the artificially produced hybrids (Gale et al, 2019).

Gale, et. Al (2019) surveyed the Banna city market of Yunan Province, which borders Burma, and recorded illegal wild orchid species in the black market and that of 35 Paphiopedilum species listed under CITES Appendix I. Some of those found being trafficked there were also recorded in the Salween Peace Park. Similarly, the international trade from Lao PDR and Myanmar into Thailand for domestic consumers found key site border-crossing, shipping networks, and marketplaces within Southeast Asia countries. The main marketplace is in Thailand at Jatujak Market, Bangkok, while the species also come from Thai-Burma Border along Kawthoolei-Thai border at Mae Sot, Chedi Sam Ong and Dan Singkorn Markets, of which Mae Sot is the biggest trade route (Phelps, 2015). The destination of this illegal wild orchid trade could end up in Bangkok's Jatujak Market because it is a regional center of botanical trade, hosting a large and unique richness of wild plant species, and it has long been recognized as a centre of illegal trade of many endangered species, including flora groups (Phelps, 2015).

The illegal wild orchid trade is an upcoming hot issue not only due to the black market and ground transport but also on social media and online marketing. Hinsley et al. (2015) discovered that orchid buying on online international orchid shows is popular. Moreover, some male hobbyist grower customers pay higher prices for

species that are rarer in the trade, which puts the importance and rarity as a driver of hobbyist trade (Hinsley et. al, 2015).

According to Phelps (2015), preliminary threat analysis of illegal trade, which comprises the vast majority of Appendix II orchid species from Southeast Asia countries, cannot be scientifically defensible until more ecological data become available. Due to the lack of data from the majority of orchid species to conduct evaluations based on IUCN Red List criteria or to complete CITES, the research has neither been conducted, nor is viable for most species in the region (Phelps, 2015). When most of the papers discussed wild orchid trade for ornamental uses, Toordoff et.al (2011), on the other hand, stated that the collection of wild orchid species for medical trade in northern and northeastern Burma had wiped them out from some of their natural ranges.

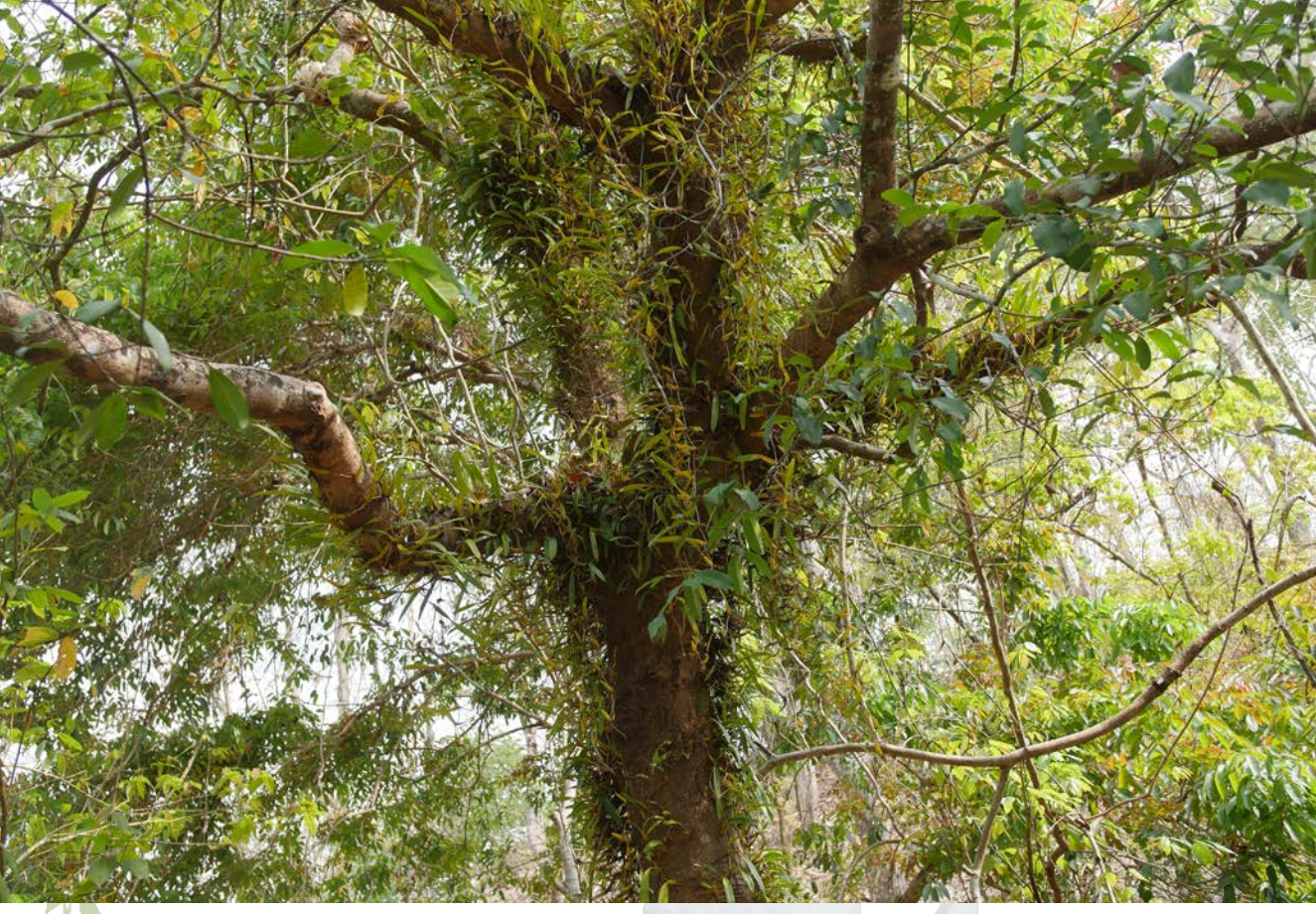
Objectives:

1. To record the wildlife orchid species composition of Salween Peace Park in different forest types

2. To identify different threats to the wild orchids of Salween Peace Park

3. To evaluate into which categories the recorded species fall under IUCN Red List and CITES Appendix

4. To explore the uses of traditional wild orchids, conservation knowledge and conservation actions taken by indigenous Karen People of Salween Peace Park



3. Research Methodology of wild orchids

Study area

The study took place in three areas of Salween Peace Park Mutraw District Northern Karen State, Burma. The Salween Peace Park lies on Long N: 18° 29. 970° and Lat: E: 096° 58.635' at about 30-kilometer North of Hpa-Pu Town. The surveys were conducted in the forest, starting from the western Salween River at Thai-Burma to the mountain peak of (Thawthee- Pworgaw) or Nattuang Mountain. The forest types raised up from mixed deciduous forest, Pinus Forest, and montane evergreen forest. The mix-deciduous started from around 100 - 800 m.asl (meter above sea-level), followed by Pinus Forest commonly seen from 700- 2000 m.asl, where montane evergreen forest begins from 1,500 – 2,615 m.asl above sea level.

The mix-deciduous forest type of the survey area is rich in Lamiaceae, Lythraceae, and Fabaceae, Teak (Tectona grandis), which are the most abundant canopy species

in this forest type (KESAN, 2008). However, the other tree species that make up the forest canopy include *Lagerstroemia calyculata, Lagerstroemia balansae, Xylia xylocarpa, Pterocarpus macrocarpus, Bombax ceiba, Anogeissus acuminata, Dalbergia oliveri, Terminalia mucronata, Terminalia tomentosa,* and *Terminalia alat*a. The emergent tree species of this forest are predominately *Shorea obtuse, Tetrameles nudiflora*, *Dipterocarpus costatus* and *Hopea odorata*, and Ficus species. Survey areas in this forest took place both in selected logging sites of 30 years ago and primary forest types. It is found at around 100 -800 m. asl.

The Pinus Forest types are composed of only two species of tropical pines, which are *Pinus merkusii* (the two-needle pine) and *Pinus kesiya* (the three-needle pine). *Pinus merkusii* is found in the lower elevation, where *Pinus kesiya* is found only in the higher elevation above 800 m a,s.l*. Litsea monopetale, Sapindus rarak, Protium serratum, Duabanga grandiflora*, *Erythrina stricta, Syzygium fruticosum, Garcinia pedunculata*. The emergent trees are *Pinus kesiya* and *Schima wallichii.* The most common tree in Pinus Forest wetland is *salix tetrasperma*. The orchid survey in these

forest types took place both in primary forest and secondary forest. The secondary forest is mainly cut for rotational farming. This type of forest is commonly seen at the elevation between 700 – 2,000 m. asl.

Montane evergreen forest is comprised many kinds of oak species and includes Rhododendrons spp. However, rattans and *Caryota obtuse* are also found in the forest. The forest types in Karen State have never been cut down, so it remains as close forest types mostly on the ridges and mountain top of higher elevation. Field orchid survey in this area took place only in the primary forest because the forest of this type has never been touched since time immemorial. This forest type is considered by the local people as a sacred forest site. This forest type, particularly in Salween Peace Park, can be found at an elevation between 1,500 - 2,615 m. asl.

3.1. Field research methods

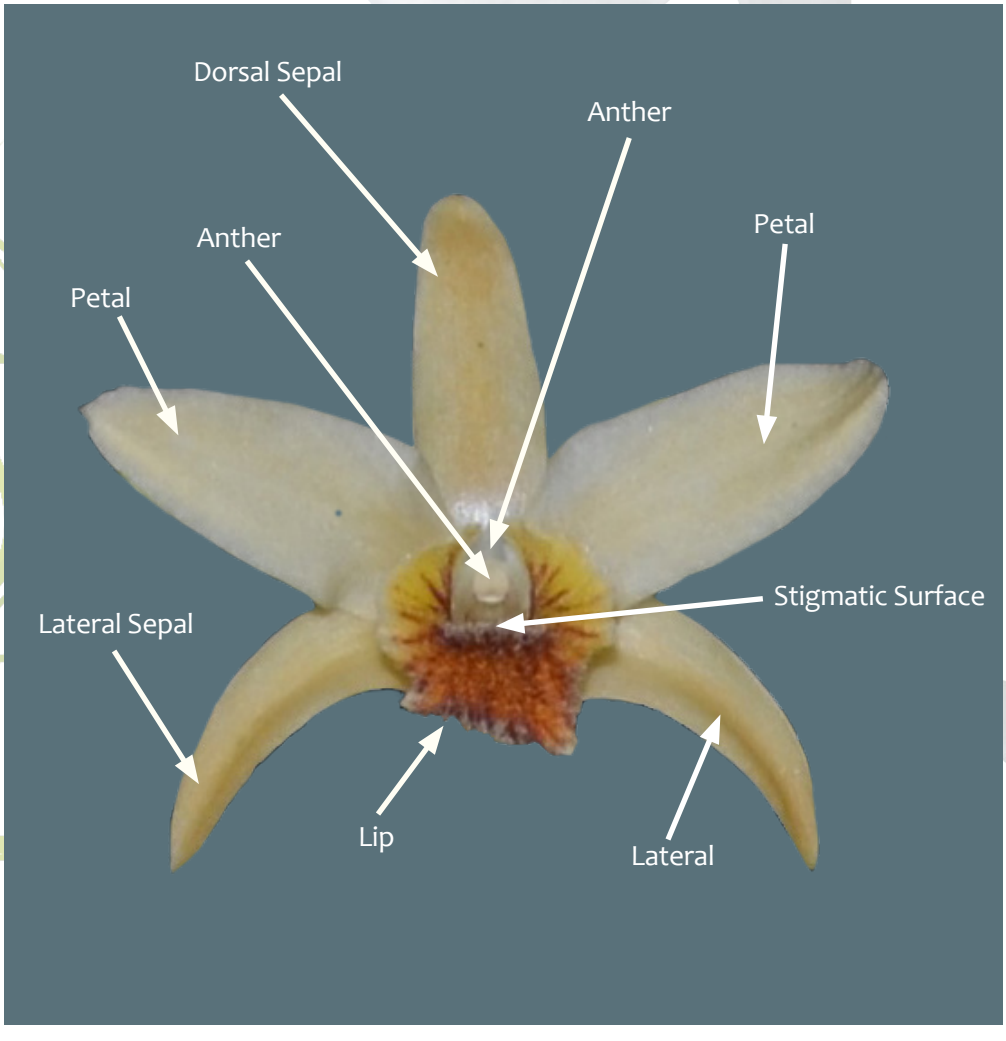
Field work

The wild orchid surveys were carried out from March 2012 to April 2016. The field survey predominately took place from March to April each year over 5 years. However, the other survey that took place from September to February 2012 - 2016 happened only once per year. These field surveys were to record the presence and absence of wild orchid, particularly, the wild orchid that grows on the trees. Since this survey aims to document the composition and richness of the orchids in each forest type, both in-situ and *ex-situ* explorations were also made. During the *in-situ* survey, all orchids encountered were photographed and recorded in the separate paper for the species local names, sizes were measured, color plates, date, times, ages, and forest types of the forest. We also recorded the orchids on specific tree species that they grow on. However, the traditional taboo prohibits us from extracting the species from its habitats or killing them. The sign of threat types to the habitat was also recorded. Sometimes, we also conducted the ex-situ survey by visiting the villager's backyard to see if they had planted wild orchid in their garden. It was very common to see local villagers planted wild orchid in their backyard to save the falling flowers from big tree branches. This kind of orchid

was documented and the owners were asked about the origin of the flower. We recorded all color plates, sizes, number of petals, lips, column, anther, and stigma.

To identify the orchid, we used both orchids of Myanmar guidebook and wild orchids of Thailand guidebook. We also used local knowledge such as sighting, touching, sensing, and tasting. This is the traditional method of orchid species identification while traveling inside the forest. We also took photos of unknown flowers and brought them back to the village to ask for the species' local names.

Furthermore, we asked villagers to participate in field survey days in certain areas because we wanted them to identify and pick up some orchids that they already knew and used. We observed the way they talked to their youth and how they identified the species by picking up orchids, chewed them, smelled them, observed them, and talked with their young during the identification process. Sometimes, villagers could identify some orchids without seeing their flowers but through smell and taste and forms of the plant such as leaves structure, stems, and colors.



Women research team

Naw P'Lae

Naw Hsa Yu

Naw Bway Wah Paw

Interview

In the field, we conducted interviews with local villagers about their knowledge of the wild orchids and their culturally significant species. We did not make them answer the forms because it would reduce their confidence, so we looked at the pictures of the orchids together and discussed with them one by one. During the discussion, we could raise several questions and record it through memorization, tape recorder, and note taking. We also asked for their traditional knowledge of wild orchid conservation and the traditional taboos toward the orchid species. We conducted small group meetings and showed them each recorded wild orchid species to know how they used each species such as, for food, medicine, tradition, and other cultural uses.

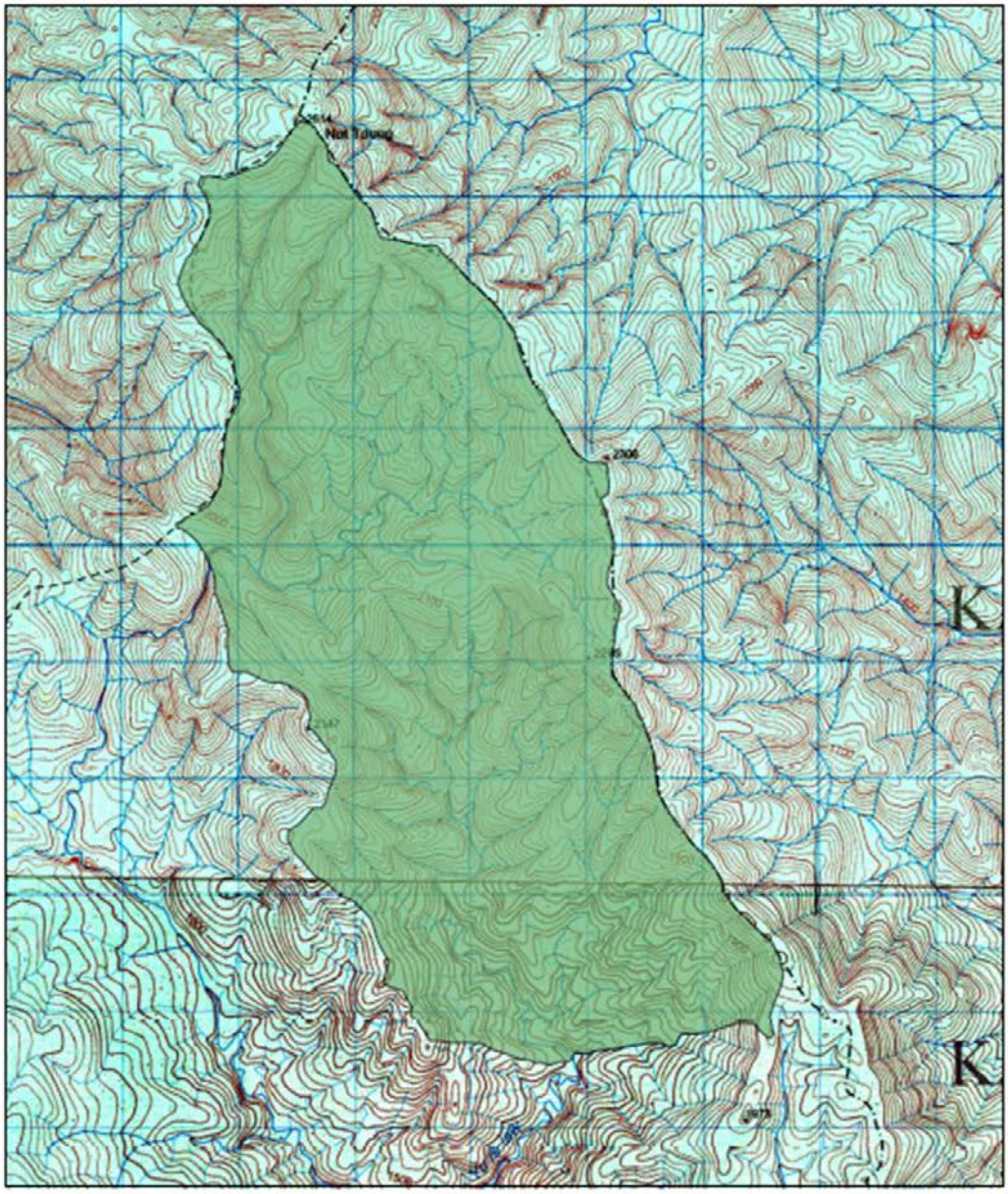
When we travelled, if we encountered some villagers using flowers, we started talking to them about how they use them, why they use them, and where they collected them and their flowering period, scarcity, abundance, and trading concerns.

Finally, we conducted meetings three times with a big group and presented our findings to the public to get their responses and suggestions. The following information was gathered for each of the orchid species traded over that period: the local name of the species, evidence of extraction for illegal trading, and route of trading.

Threats

We recorded all signs of threat that we encountered during the survey times. We also interviewed several villagers about the types of threats toward wild orchids and evidence of wild orchid trade they encountered or heard about. The interview was also conducted with security officers who confiscated and witnessed the orchid trades along the Thai-Burma border and other trade routes while at the checkpoint. The dealing with confiscated illegal trade of wild orchids by officer was also observed. Personal observation of wild orchid trading was also made in the market areas of the Salween River. We had friendly and direct communication with the orchid traders while sleeping in the same house when we travelled along the Salween River. The traders honestly talked to me about how she bought and sold the orchids and the price of each orchid species. She also told me where they sold the orchids.

Lae Kee Community Forest



Legend

Community Forest

Lae Kee Community Forest

5,466 Acres

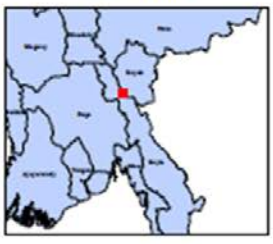
CLARKE 1866 SPHEROID
WGS 1984 UTM ZONE 47N
MEAN SEA LEVEL

1:50,000

0 1,000 2,000

Meters

Location Map



3.2. Orchid identification methods

Specie identification

Since our team members were from the indigenous Karen background, they already knew more than 70 percent of the species. However, some species that were not very common, particularly in the primary montane forest which were not known by villagers or survey team members. These species were compared with the orchid guidebooks of both Thailand and Myanmar. We also searched a number of websites, including IUCN Red List searching, CITES search, references, and other plant database to identify unknown species.

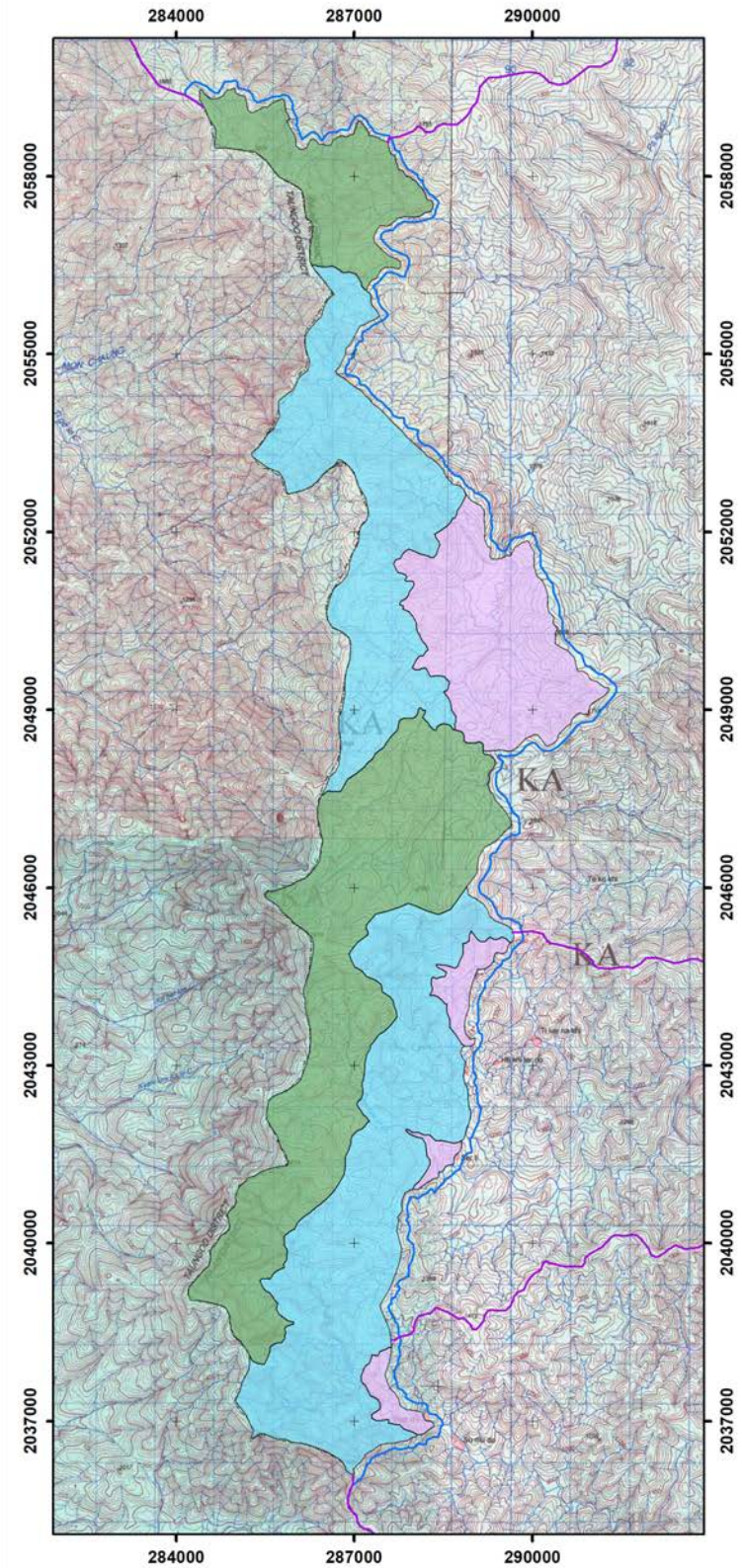
Threatened categories

The endangered species were categorized based on three references. The first one is searching result from the IUCN (International Union for Conservation of Nature) Red List, the second is its listing in the CITES search list as endangered, and the final one is listing as endangered based on its endemism in Myanmar (Aung et al. 2020).

Analysis of data

The data were analyzed according to the obtained information from this survey, which included the record of composition species, trade categories in CITES, threatened status under the IUCN Red List, species endemic to Burma, number of species recorded in different forest types, species habitat types, traditional use, and detail of uses. The relative proportion of numbers and percentages of recorded species were further calculated and converted into tables and figures.

Kheshorter Community Forest



1:102,000

3,000

Meters

Legend

- Buffer Zone
- Corridor
- Protected area Zone 1; 5,446 ac
- Utilization of NTFPs area Zone 2; 6,719 ac
- Traditional cultivation area Zone 3; 2,441 ac

Kheshorter Community Forest Tatal Area (14,606 acres)

Acknowledgement

KESAN

Location Map

4. Research Findings

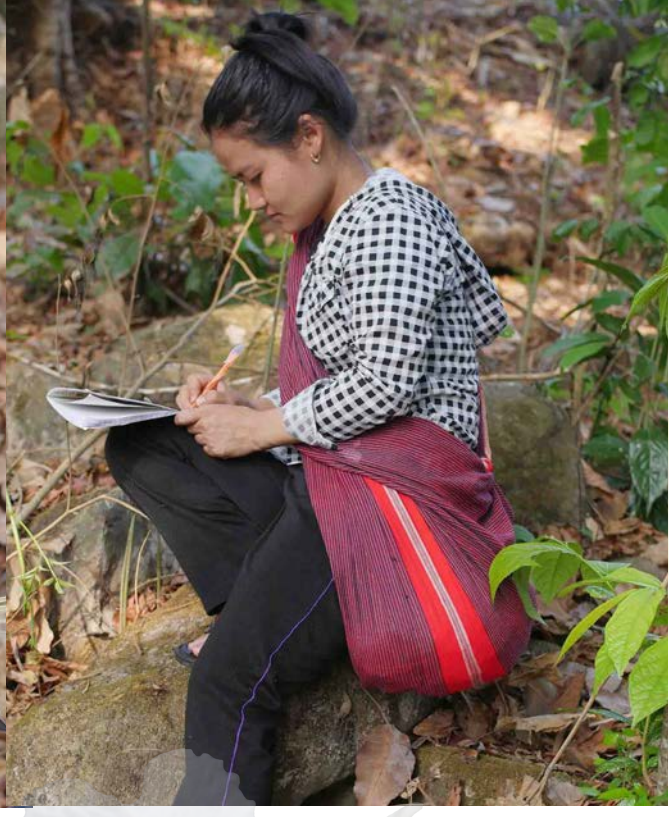
Results

Species richness and diversity

The research finding documented the Orchidaceae from Salween Peace Park Forest based on this exploration collection comprised 121 species belonging to 37 genera. All 121 species, are epiphytic. Again, when species are divided into details there are (35) species from *Dendrobium* genera, (17) species from *Bulbophyllum* genera, (11) species from Eria genera, (10) species from *Coelogyne* genera, (3) species from *Pholidota* genera, (2) species from Panisea genera, (4) species from *Cleisostoma* genera, (4) species from *Ascocentrum* genera, (3) species from *Acampe* genera, (2) species from Vanda. The rest contained 1 specie each from *Abdominea, Aerides,*

Chiloschista. Cirrhopetalum, Diploplora, Epigeneium, Flickingeria, Gastrochilus, Holcoglossum, Luisia, Micropera, Ornithochilus, Otochilus, Paphiopedilum, Pinalia, Pleione, Porpax, Rhynchostylis, Schoenorchis, Smitinandia, Stelis, Sunipia and Thunia generas.

Furthermore, there are (2) endemic species to Burma (Aung et.al, 2020). Some species' pictures were collected during exploration time in the forest. However, some species that live high in the tree canopy could not be photographed, so we took the photo from ex-situ areas, particularly from the species that are planted by the villagers in their gardens or backyard. All the species are listed in the appendix of this report.



All the species recorded were further compared by searching the status on the CITES list (Convention on International Trade in Endangered Species of Wild Fauna and Flora). The search confirmed that 1 species fall in the categories of APPENDIX I, which are threatened with extinction, 114 species fall into the categories of APPENDIX II, which can become threatened by extinction if the trading of species is controlled. However, none of the species were on the APPENDIX III list (CITES, 1983). Similarly, 6 species, 1 of which are endemic (Aung et. al, 2020), were not found in CITES categories. The two endemic species belong to each of Vanda and Dendrobium genera.

Table 1. Shows the Status summary of the recorded spices on CITES and IUCN list

CATEGORIES	NUMBERS	IUCN STATUS
CITES APPENDIX I	1	VU
CITES APPENDIX II	114	
NOT IN THE LIST OF CITES OR IUCN	6	
GENUS	37	

Again, we compared the species that are illegally traded into Thailand and neighboring countries based on (Phelps, 2015; Gale, 2019) reports. The discovery was very high, with half of the species recorded in the Salween Peace Park found in this illegal trade list. In comparing the data from the field with two references to orchid trade paper, the results show that some wild orchid species found in SPP were recorded in Bana City black market of Yunnan Province China (Gale et. al, 2019), some species were already recorded in TRAFFIC (Phelps J. 2015) while other species were not yet recorded in TRAFFIC report. The total of 47 species were recorded in TRAFFIC (Phelps J. 2015).

It is also another concern that one of the recorded species, particularly *Eria obese*, (Phelps 2015: IOSPE, 2020), was found in the illegal trading list but not listed under the CITES List. The specie should be considered for inclusion on the CITES list for protection.

4.1. Orchid recorded from the surveys

Orchid trade in Salween Peace Park

According to personal encounters with the traders, the wild orchids that are illegally extracted from Salween Peace Park are transported to Mo Chit City in Karenni State and then transported again to the Thai-Myanmar border in the northern region, such as Mae Hong Song and Golden Triangle areas between Shan State and Thailand. When asked about selling them to Thailand at Thai-Myanmar border at Karen State, the trader said that the Salween River was an unsafe route to transport them along, as tons of her friend's orchids had been confiscated by Karen Forest Rangers and destroyed at the Salween River Checkpoint. The trader was from Mo Chit City, so she bought tons of orchids each year from the local traders and then sent them back to Mo Chit City, Karenni State, to other traders.

The local people also pointed out in the interview that the illegal orchid trade also went directly to Mo Chit City by the land route and to the western route of Salween Peace Park to the other cities of Myanmar. Since this orchid trade is illegal, the amount of illegal trade per year was unknown, but it is estimated that at least 10 tons per year are harvested from SPP.

Moreover, we searched to confirm with IUCN Red List Search to see if the species that were recorded fall under the threatened species list. However, it is impossible to see some of the species that are endemic to specific countries listed on the IUCN Red List. We also took the information from CITES, where we found the species listed in CITES as Endangered and listed as Endangered in Aung et. al (2020). There was a total of 6 species recorded as EN (Endangered species) of which 4 species were listed as endangered under CITES search pages, and 2 EN species listed under Aung et. al (2020) as local species of Myanmar. Again, 1 species were recorded as VU (vulnerable), 1 LC (Least Concern), 1 DD (Data insufficient) species under IUCN Red List categories. However, over 110 species were not evaluated by IUCN.

4.2. Research Discussion and Limitations

This is the first survey of orchids in the Salween Peace Park, so the lack of references and guidebooks to identify orchids limited our analysis. Our identification is based on the local people's knowledge and references from other countries; basically, Thailand guidebooks and internet search were not very satisfactory. We did not have access to any orchid experts or plant labs to help with plant samples. Moreover, the prohibition of extracting flowers or taking flower parts to the lab outside customary land for identification stopped us from identifying some unknown flowers. We used the internet-based search and compared the Myanmar orchid list from Aung et. al (2020) and (WIF, 2020) to know the species names and status within Myanmar. We also used a Thai wild orchid guidebook called "A Field Guide to the Wild Orchids of Thailand" (Vaddhanaphuti, 2005). Despite the lack of human resources and experts, we tried our best to go through the different papers to make our research findings more effective and interpretable to the public.

Ethnobotany species.

hpaw nạ duh

Paphiopedilum villosum **Lindl. IUCN VU**

Montane primary forest
Traditionally treated ear infection
Ornamental uses

hpaw daw nyà ga mẹh

Dendrobium chrysanthum **Wallich.**

Used in poem to teach children in the indirect history or proverbs Indicated the time of preparation for seedling for crop Flowers boiled with Shikakai, reetha and turmeric root for traditional shampoo and ornamental use

hpaw htòh gèe

Dendrobium thyrsiflorum **Rchb.f**

Used in poem to teach children in the indirect history or proverbs Indicated the time of preparation for seedling for crop Flowers boiled with Shikakai, reetha and turmeric root for traditional shampoo and ornamental use

hpaw hsọh baw

Dendrobium senile **Parish ex Rchb.f.**

Pinus primary and secondary forest
Indicated the time of preparation for seedling for crop Flowers boiled with Shikakai, reetha and turmeric root for traditional shampoo and ornamental uses

hpaw mụ hkah

Dendrobium eriiflorum **Griff.**

Pinus primary and secondary forest

Treated broken bone, bone injury and joint pain

Paw mọh lah (hpaw tha ee ta moo lah)

Vanda coeruela **Griff. ex Lindl.**

Pinus primary and secondary forest

Flowers boiled with Shikakai, reetha and turmeric root for traditional shampoo and ornamental uses

hpaw ta moo èh

Dendrobium infundibulum **Lindley**

Montane primary forest

Flowers boiled with Shikakai, reetha and turmeric root for traditional shampoo and ornamental uses

htòh göh (ga nuh)

Thunia alba **Lindl. Rchb. f.**

Mix-deciduous primary forest

Flowers boiled with Shikakai, reetha and turmeric root for traditional shampoo and ornamental uses

paw loh gaw

Dendrobium chrysotoxum **Lindley.**

Pinus primary and secondary forest
If see blooming it is time to prepare for seedling

Flowers boiled with Shikakai, reetha and turmeric root for traditional shampoo and ornamental uses

hpaw bu klee ghāw

Dendrobium cariniferum **Reichb.f**

Pinus primary and secondary forest
If see blooming it is time to prepare for seedling

Flowers boiled with Shikakai, reetha and turmeric root for traditional shampoo and ornamental uses

5.Women's Research Group Members

No	Names	Places	Occupations
1	Naw P' Len	T' May Kee Village	KESAN Women Research Team lead
2	Naw Hsa Yu	Len Kee Village	KESAN Women Research Team manager
3	Naw Bwey Wah Paw	Sei Khen Der Village	KESAN Women Research Team staff
4	Naw Beauty Say	Taw Koo Mu Der Village	Kheshorter CF women Research team member
5	Naw Bue La Plaw	Ta Ken Der Village	Kheshorter CF women Research team member
6	Naw Moo Ko Paw	Plo Kee Village	Kheshorter CF women Research team member


nạw pa leh


nạw bwày wah hpaw


nạw byoo htèe say


nạw bu là plaw


nạw moo kòh hpaw


nạw hsà yụ

6. CONCLUSION

The result of this first survey provides significant knowledge of wild orchid diversity and richness in the Salween Peace Park. There is a wide range of different knowledge gained from this research, including the traditional use of wild orchids, the taboos, the sacred sites, and the corridors that enhance wild orchid conservation. Also, the imminent threat to the wild orchids of SPP and border trade routes to different places is reviewed. The finding recommended to us that if we want these wild orchids to survive in the future, we need to act now. It gives us a bigger picture of how to protect the remaining orchid species by taking immediate action. Policy is required for effective law enforcement to stop this illegal trade because traditional taboos could not be applied when most traders are outsiders.

The great demands for wild orchid trade exist because it is relatively cheap to operate the trade because local harvesting is low paying work and illegal harvests are not fined which consequently orchids face over-harvesting in their natural range. However, the good news is that the local people are already willing to protect the wild orchid species that they consider sacred to them. So, if we join hands with the local villagers to provide more assistance to them, we have no doubt that these orchid species will be fully protected in near future.

Abbreviations

CITES - Convention on International Trade in Endangered Species

DKBA - Democratic Karen Buddhist Army

IDP- Internally Displaced Person, forced from their home by war

KESAN - Karen Environmental and Social Action Network

KNLA - Karen National Liberation Army KNU Karen National Union

MTE - Myanmar Timber Enterprise, SPDC's logging company

NGO - Non-Governmental Organization

RECOFTC - Regional Community Forestry Training Center, Kasetsart Univ., Thailand

SPDC - Burma's ruling junta, the State Peace and Development Committee

WEFCOM - Thailand's Western Forest Complex, adjacent to Megatha Forest

WWF - World Wildlife Fund

CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora

IUCN - International Union for the Conservation of Nature Kawthoolei Karen People's chosen name for the Karen state

EX - Extinct

EW - Extinct in Wild

CR - Critically Endangered

EN: Endangered

VU - Vulnerable

NT - Near threatened

LC - Least Concern

DD - Data Deficient

***In-Situ*:** Situated in the original place:

Ex-Situ – Away from the natural location

PRCF - People Resources Conservation Foundation

TRAFFIC - Trade Records Analysis of Flora and Fauna in Commerce

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Appendix I: Flower Species

Meaning of the Symbols below

- Endangered Species
- Vulnerable Species
- Least Concern
- Data Insufficient

No	Karen Name	Sciencetific Name	Status Appendix	IUCN	Remark
1	hpaw gụh kòh	*Abdominea minimiflora* **Hook. f.**	II		
2	hpaw māy hkay gẹe baw	*Acampe ochracea* **Lindl.**	II		
3	hpaw māy hkay ‘dòh plāy	*Acampe praemorsa* **(Roxb.) Blatter & McCann**	II		
4	hpaw māy hku wah lü	*Acampe thailandica* **Seidenf.**	II		
5	hpaw htwèe mẹh wah thä	*Aerides rosea Loddiges ex* **Lindl.**	II		
6	hpaw bèe bay ghāw	*Ascocentrum curvifolium* **Lindley.**	II		
7	hpaw bèe bay baw	*Ascocentrum miniatum* **Lindley.**	II		
8	hpaw bèe bay lü sạ	*Ascocentrum pusillum* **Aver.**	II		
9	hpaw bèe bay lü	*Ascocentrum ampullaceum* **Roxb.**	II		
10	hpaw soo nạ thuh plāy	*Bulbophyllum bifurcatoflorens* **Fukuy.**	II		
11	hpaw pa sọh plāy	*Bulbophyllum capillipes* **Rchb.f.**	II		
12	hpaw yōh hàw mẹh hkä	*Bulbophyllum careyanum* **Hook.**	II		
13	hpaw yōh hàw mẹh baw	*Bulbophyllum elassonotum* **Summerh.**	II		
14	hpaw glä thày baw	*Bulbophyllum exiguum* **(Unknow).**	II		
15	hpaw bu sēh lāy kòh	*Bulbophyllum hirtum* **Lindl.**	II		
16	hpaw yōh hàw mẹh lü	*Bulbophyllum lilacinum* **Ridl.**	II		

No	Karen Name	Sciencetific Name	Status Appendix	IUCN	Remark
17	hpaw glä plāy	*Bulbophyllum lingulatum* **(Unknow).**	II		
18	hpaw hpeh htee	*Bulbophyllum lobbii* **Lindley.**	II		
19	hpaw nàw wạ	*Bulbophyllum longipes* **Rchb.**	II		
20	hpaw jöh gu	*Bulbophyllum membranifolium* **Hook. f.**	II		
21	hpaw tạ plāy hkä	*Bulbophyllum picturatum* **Rchb.f**	II		
22	hpaw tạ plāy baw daw thèe	*Bulbophyllum retusiusculum* **Rchb. f.**	II		
23	hpaw bu sēh	*Bulbophyllum rufinum* **Rchb.f.**	II		
24	hpaw pạy dëe	*Bulbophyllum sanitii* **Seidenf.**	II		
25	hpaw soo nạ lạy thà	*Bulbophyllum siamense* **Rchb.f**	II		
26	hpaw baw ghāw plāy	*Bulbophyllum sillenianum* **Rchb.f.**	II	DD	
27	hpaw ghẹe kòh	*Chiloschista exuperei* **Guillaumin.**	II		
28	hpaw tạ plāy lü kòh thèe	*Cirrhopetalum strangularium* **Rchb. f**	II		
29	hpaw hplöh pwāy	*Cleisostoma crochetti* **Gull.**	II		
30	hpaw sēh wah thä	*Cleisostoma fuerstenbergianum* **Kranzl.**	II		
31	hpaw wah plāy lü söh	*Cleisostoma linearilobatum* **Seidenf.**	II		
32	hpaw ta yay hpaw	*Cleisostoma racemiferum* **Lindl.**	II		
33	hpaw hpeh thoh	*Coelogyne brunnea* **Lindl.**			
34	hpaw' dòh plāy ga hpòo hkä	*Coelogyne fimbriata* **Lindl.**	II	EN	
35	hpaw baw plāy sēh	*Coelogyne lactea* **Rchb .f.**	II		
36	hpaw hpeh thoh wah hkä thä	*Coelogyne lentiginosa* **Lindl.**	II		
37	hpaw bòh hkä gway	*Coelogyne longipes* **Lindl.**	II		
38	hpaw thày ahhōh day	*Coelogyne nitida* **Lindley.**	II		

No	Karen Name	Sciencetific Name	Status Appendix	IUCN	Remark
39	hpaw dòh plāy soo plāy	*Coelogyne pallens* **Ridl.**	II		
40	hpaw say baw plāy	*Coelogyne schultesii* **S.K.Das.**	II		
41	hpaw thày dōh òh kàw	*Coelogyne trinervis* **Lindl.**	II		
42	hpaw hpeh thòo plāy	*Coelogyne triplicatula* **Rchb.f.**	II		
43	hpaw ghāw gẹe	*Cymbidium bicolor* **Lindl.**	II		
44	hpaw say nạ sēh	*Cymbidium eburneum* **Lindl.**	II		
45	hpaw ghẹe gẹe lü	*Dendrobium aphyllum* **Roxb.**	II	LC	
46	hpaw thee kòh thoo	*Dendrobium bilobulatum* **Seidenf.**	II		
47	hpaw bu klee ghāw	*Dendrobium cariniferum* **Reichb.f**	II		
48	hpaw daw nyà ga mẹh	*Dendrobium chrysanthum* **Wallich.**	II		
49	hpaw loh gaw	*Dendrobium chrysotoxum* **Lindley.**	II		
50	hpaw mụ hkah	*Dendrobium compactum* **Rolfe.**	II		
51	hpaw wà day wah	*Dendrobium crumenatum* **Swartz.**	II		
52	hpaw ghẹe htee baw ga wāw thä	*Dendrobium crystallinum* **Rchb. f.**	II		
53	hpaw htòh gèe baw lah	*Dendrobium densiflorum* **Lindl.**	II		
54	hpaw ghẹe htee baw thä ga hpòo	*Dendrobium devonianum* **Paxton.**	II		
55	hpaw mụ hkah lah thä	*Dendrobium eriiflorum* **Griff.**	II		
56	hpaw dwèh htee	*Dendrobium exile* **Schltr.**	II		
57	hpaw ghẹe htee thoo thä	*Dendrobium falconeri* **Hook. f.**	II		
58	hpaw daw nyà daw day	*Dendrobium fimbriatum* **Hooker.**	II		
59	hpaw wà day lah naw	*Dendrobium fytchianum* **Bateman.**	II		

No	Karen Name	Sciencetific Name	Status Appendix	IUCN	Remark
60	hpaw baw tạ sōo	*Dendrobium gibsonii* **Paxton.**	II		
61	hpaw ghẹe htee baw thä	*Dendrobium gratiosissimum* **Rchb.**	II		
62	hpaw nạ sēh dòh kàw	*Dendrobium gregulus* **Seidenf.**	II		
63	hpaw thä ga lä	*Dendrobium heterocarpum* **Wall.**	II		
64	hpaw ta moo èh	*Dendrobium infundibulum* **Lindley**	II		
65	hpaw thëh boh daw day	*Dendrobium lindleyi* **Steud.**	II		
66	hpaw htòh göh bu klee	*Dendrobium luteolum* **Bateman.**	II	EN	
67	hpaw kàw nyah	*Dendrobium parcum* **Rchb.f.**	II		
68	hpaw ghẹe htee dòh day	*Dendrobium pendulum* **Roxb.**	II		
69	hpaw hsgoh ḷa ga mẹh	*Dendrobium pinifolium* **Ridl.**	II		
70	hpaw ghẹe htee gẹe lü	*Dendrobium primulinum* **Lindley.**	II		
71	hpaw boo plāy ghāw	*Dendrobium scabrilingue* **Lindley.**	II		
72	hpaw mụ hkah baw hsòo	*Dendrobium senile* **Parish ex Rchb.f**	II		
73	hpaw hsaw dèe ta gāw	*Dendrobium stuposum* **Lindl.**	II		
74	hpaw dwèh thoh wah	*Dendrobium sutepense* **Rolfe ex.**	II		
75	hpaw dwèh thoh baw	*Dendrobium sutepense* **sub. spp.**	II		
76	hpaw htòh gee baw (hpaw bu klee)	*Dendrobium thyrsiflorum* **Rchb.f**	II		
77	hpaw baw baw (hpaw hsoh baw)	*Dendrobium trigonopus* **Rchb. f.**	II		
78	hpaw hsgoh ghāw	*Dendrobium unicum* **Seidenfadden.**	II		
79	hpaw ghẹe htee thaoo kee gay thä	*Dendrobium wardianum* **Warner.**	II		

No	Karen Name	Sciencetific Name	Status Appendix	IUCN	Remark
80	hpaw dòh plāy blëe nạ	*Diploplora truncata* **Roffe.**	II		
81	hpaw thoo plāy	*Epigeneium amplum* **Lindl.**	II		
82	hpaw dòh day hkä plāy	*Eria amica* **Rchb. f.**	II		
83	hpaw bu kay doh	*Eria globulifera* **Seidenf.**	II		
84	hpaw htòh plāy	*Eria javanica (Sw.)* **Blume.**	II		
85	hpaw nyà meh	*Eria muscicola* **(Lindl.)**			
86	hpaw ta ay	*Eria obesa* **Lindl.**			
87	hpaw tạw là	*Eria ornata* **Lindl.**			
88	hpaw hsà baw	*Eria pannea* **Lindl.**	II		
89	hpaw mụ hkah gway lü	*Eria (Pinalia)* **sp.**			
90	hpaw kàw dèe duh	*Eria pusilla* **Lindl.**	II		
91	hpaw su nyah	*Eria tomentosa* **J.König**	II		
92	hpaw dòh day baw plāy	*Eria xanthocheila* **Ridl.**	II		
93	hpaw klëe plāy baw	*Flickingeria macraei* **Lindl.**	II		
94	paw kay bway	*Gastrochilus bellinus* **Rchb.f**	II		
95	hpaw thee tha moo wah	*Holcoglossum subulifolium* **Rchb. f.**	II		
96	hpaw lah mẹh	*Liparis plantaginea* **Lindl.**	II		
97	hpaw thòh ghēh	*Liparis viridiflora* **Blume.**	II	EN	
98	hpaw htwèe hpah nyeh nyāw	*Luisia macrantha* **Blatt.**	II		
99	hpaw htwèe mẹh thab lay	*Micropera rostrata* **Roxb.**	II		
100	hpaw yụ mẹh	*Oberonia acaulis* **Griff.**	II		
101	hpaw mù ay	*Oberonia falconeri* **Hook.f.**	II		

No	Karen Name	Sciencetific Name	Status Appendix	IUCN	Remark
102	hpaw thoo gẹe	*Ornithochilus difformis* **Schlechter.**	II		
103	hpaw ga pāy	*Otochilus albus* **Lindl.**	II		
104	hpaw thoh là baw	*Panisea tricallosa* **Rolfe**	II		
105	hpaw thoh là	*Panisea uniflora* **Lindl.**	II		
106	hpaw nạ duh	*Paphiopedilum villosum* **Lindl.**	I	VU	
107	hpaw pạy bweh bo dee	*Pholidota articulata* **Lindl.**	II		
108	hpaw say thày	*Pholidota convallariae* **Hook.f.**	II		
109	hpoh tụh day der	*Pholidota imbricata* **Roxb.**	II		
110	hpaw gạ ploḥ	*Pinalia stricta* **Lindley.**	II		
111	hpaw thày hòh day	*Pleione maculata* **Lindl.**	II		
112	hpaw htòh gèe nọh	*Porpax lanii* **Seidenf.**	II		
113	hpaw htwèe mẹh pọh peh	*Rhynchostylis retusa* **Blume.**	II		
114	hpaw hu nëe	*Schoenorchis gemmata* **Lindl.**	II		
115	hpaw pa sāw htee	*Smitinandia micrantha* **Lindl.**	II		
116	hpaw pa thuh day	*Stelis gracilis* **(Unknow).**	II		
117	hpaw ta hsèh gòh baw plāy	*Sunipia rimannii spp* **(Unknow).**	II		
118	hpaw dä baw	*Thrixspermum centipeda* **Lour.**	II	EN	
119	hpaw htòh göh ga nuh	*Thunia alba* **Lindl. Rchb. f.**	II		
120	hpaw thee ta moo hkä	*Vanda vipanii Rchb. f.*		EN	
121	hpaw thee ta mòo lah	*Vanda coeruela Griff. ex Lindl.*	II		
Total species 121		Total families **37**			

Appendix II Flower Species Photos

hpaw gụh kòh - *Abdominea minimiflora* **Hook. f.**

hpaw māy hkay gẹe baw - *Acampe ochracea* **Lindl.**

hpaw māy hkay dòh plāy - *Acampe praemorsa* **Roxb.**

hpaw htwèe mẹh wah thä - *Aerides rosea Loddiges* **ex Lindl.**

hpaw bèe bay lü sạ - *Ascocentrum pusillum* **Aver.**

hpaw bèe bay ghāw - *Ascocentrum curvifolium* **Lindley.**

hpaw bèe bay luää - *Ascocentrum ampullaceum* **Roxb.**

hpaw jöh gu - *Bulbophyllum membranifolium* **Hook. f.**

hpaw pa soh plāy - *Bulbophyllum capillipes* **Rchb.f.**

hpaw yōh hàw mẹh baw - *Bulbophyllum elassonotum* **Summerh.**

hpaw tạ plāy hkä daw thèe - *Bulbophyllum picturatum* **Rchb.f.**

hpaw soo nạ thuh plāy - *Bulbophyllum bifurcatoflorens* **Fukuy.**

hpaw soo na lay thà
Bulbophyllum siamense **Rchb.f.**

hpaw soo na lay thà
Bulbophyllum careyanum **Hook.**

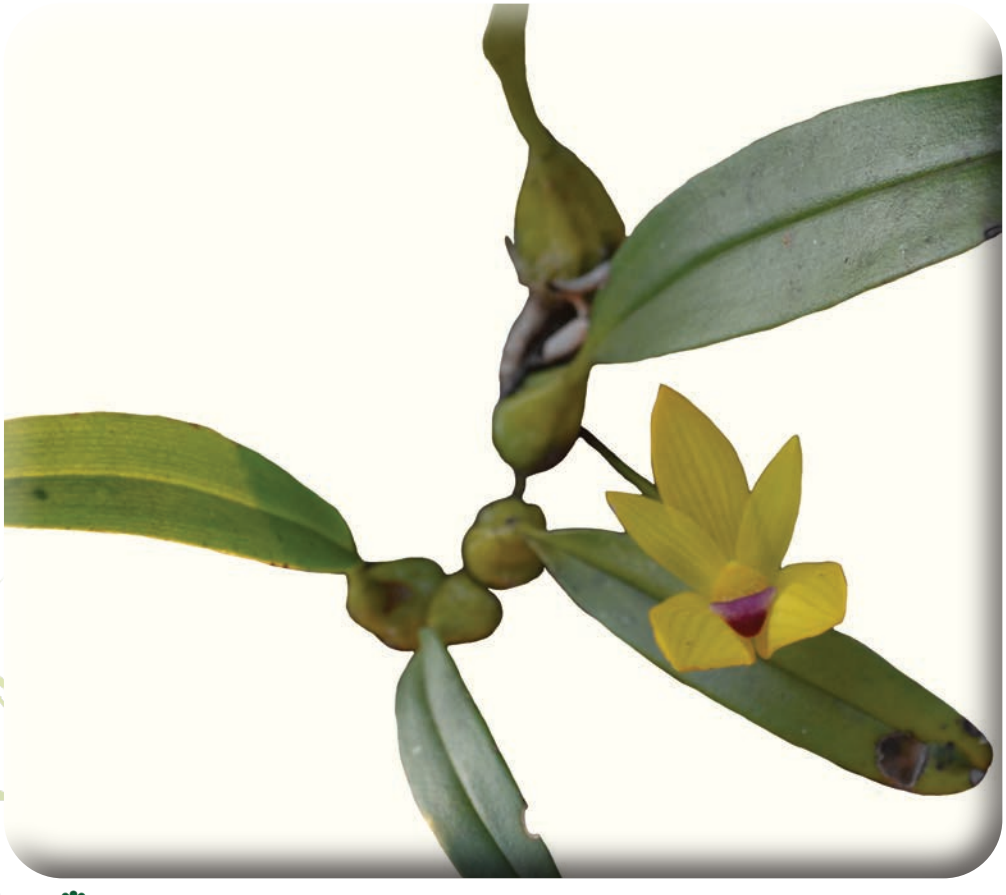
hpaw ta plāy baw daw thèe - *Bulbophyllum retusiusculum* **Rchb. f.**

hpaw glä thày baw - *Bulbophyllum exiguum* **Unknow.**

hpaw yōh hàw mę̱h lü - *Bulbophyllum lilacinum* **Ridl.**

hpaw bu sēh - *Bulbophyllum rufinum* **Rchb.f**

hpaw nàw wạ - *Bulbophyllum longipes* **Rchb.**



hpaw baw ghāw plāy - *Bulbophyllum sillenianum* **Rchb.f.**

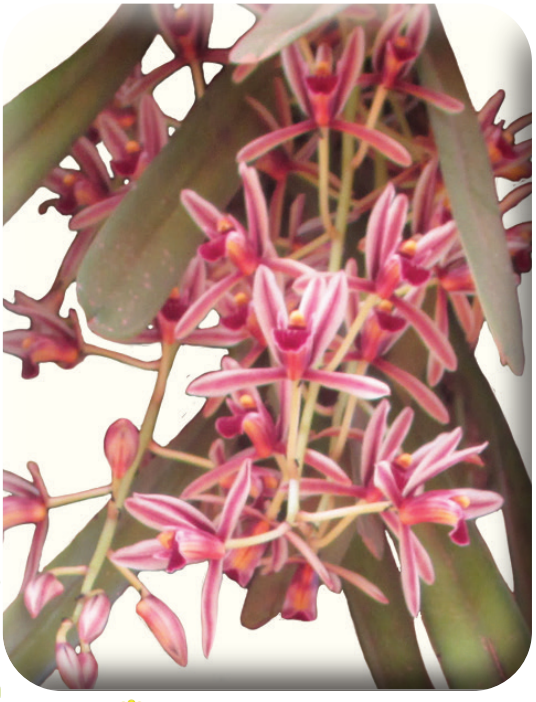
hpaw tạ plāy lü kòh thèe - *Cirrhopetalum strangularium* **Rchb. f**

hpaw bu sēh lāy kòh - *Bulbophyllum hirtum* **Lindl.**

hpaw pạy dëe - *Bulbophyllum sanitii* **Seidenf.**

hpaw ghẹe kòh - *Chiloschista exuperei* **Guillaumin.**

hpaw hpeh thoh - *Coelogyne brunnea* **Lindl.**



hpaw ghāw gẹe
Cymbidium bicolor **Lindl.**

hpaw hpeh thoo plāy
Coelogyne triplicatula **Rchb.f.**

hpaw hpeh thoh hkä thä - *Coelogyne lentiginosa* **Lindl.**

hpaw sēh wah thä - *Cleisostoma fuerstenbergianum* **Kranzl.**

hpaw wah plāy lü söh *Cleisostoma linearilobatum* **Seidenf.**

hpaw dòh plāy ga hpòo hkä - *Coelogyne fimbriata* **Lindl.**

hpaw ta yay hpaw - *Cleisostoma racemiferum* **Lindl.**

hpaw loh gaw - *Dendrobium chrysotoxum* **Lindley.**

hpaw thày ahhōh day
Coelogyne nitida **Lindley.**

hpaw say baw plāy -*Coelogyne schultesii* **S.K.Das.**

hpaw dòh plāy soo plāy - *Coelogyne pallens* **Ridl.**

hpaw ghẹe htee baw ga wāw thä - ADendrobium crystallinum **Rchb. f.**

hpaw wà day lah naw
Dendrobium fytchianum **Bateman.**

hpaw ghạy htee thoo thä
Dendrobium falconeri **Hook. f.**

hpaw ghẹe gẹe lü - *Dendrobium primulinum* **Lindley.**

hpaw mụ hkah - *Dendrobium compactum* **Rolfe.**

hpaw daw nyà daw day - *Dendrobium fimbriatum* **Hooker.**

hpaw daw nyà ga mẹh - *Dendrobium chrysanthum* **Wallich.**

hpaw thä ga lä - *Dendrobium heterocarpum* **Wall.**

hpaw boo plāy ghāw - *Dendrobium scabrilingue* **Lindley.**

hpaw dwèh thoh baw - *Dendrobium sutepense* **sub. spp.**

hpaw nạ sēh dòh kàw - *Dendrobium gregulus* **Seidenf.**

hpaw hsgoh baw hsòo - *Dendrobium senile Parish ex* **Rchb.f.**

hpaw ghạy htee baw thä ga hpòo - *Dendrobium devonianum* **Paxton.**

hpaw ga mẹh - *Dendrobium pinifolium* **Ridl.**

hpaw ghẹe htee dòh day - *Dendrobium pendulum* **Roxb.**

hpaw bu klee ghāw - *Dendrobium cariniferum* **Reichb.f.**

hpaw htòh gèe baw lah - *Dendrobium densiflorum* **Lindl.**

hpaw ta moo èh - *Dendrobium infundibulum* **Lindley.**

hpaw dwèh thoh wah - *Dendrobium sutepense* **Rolfe ex.**

hpaw mụ hkah lah thä - *Dendrobium eriiflorum* **Griff.**

hpaw wà day wah - *Dendrobium crumenatum* **Swartz.**

hpaw wà day baw thä - *Dendrobium luteolum* **Bateman.**

hpaw ghẹe gẹe lü - *Dendrobium aphyllum* **Roxb.**

hpaw thëh boh
Dendrobium lindleyi **Steud**

hpaw hsgoh ghāw
Dendrobium unicum **Seidenfadden**

hpaw kàw nyah - *Dendrobium parcum* **Rchb.f.**

hpaw baw baw (hpaw hsoh gh baw) - *Dendrobium trigonopus* **Rchb. f.**

hpaw dwèh htee = *Dendrobium exile* **Schltr.**

hpaw dòh plāy blëe nạ - *Diploplora truncata* **Roffe.**

hpaw hsaw dèe ta gāw - *Dendrobium stuposum* **Lindl.**

Dendrobium

hpaw gha̱y htee tha oo kee gay thä - *Dendrobium wardianum* **Warner.**

hpaw htòh gèe baw (hpaw bu klee) - *Dendrobium thyrsiflorum* **Rchb.f.**

hpaw nyà meh - *Eria muscicola* **Lindl.**

hpaw ta ay - *Eria obesa* **Lindl.**

hpaw bu kay doh - *Eria globulifera* **Seidenf.**

hpaw su nyah - *Eria tomentosa* **J.König.**

hpaw hsà baw = *Eria pannea* **Lindl.**

hpaw su nyah - *Eria tomentosa* **J.König.**

hpaw tàw là - *Eria ornata* **Lindl.**

hpaw dòh day hkä plāy - *Eria amica* **Rchb. f.**

hpaw thoo plāy - *Epigeneium amplum* **Lindl.**

hpaw dòh day baw plāy - *Eria xanthocheila* **Ridl.**

hpaw klëe plāy baw - *Flickingeria macraei* **Lindl.**

hpaw kay bway - *Gastrochilus bellinus* **Rchb.f**

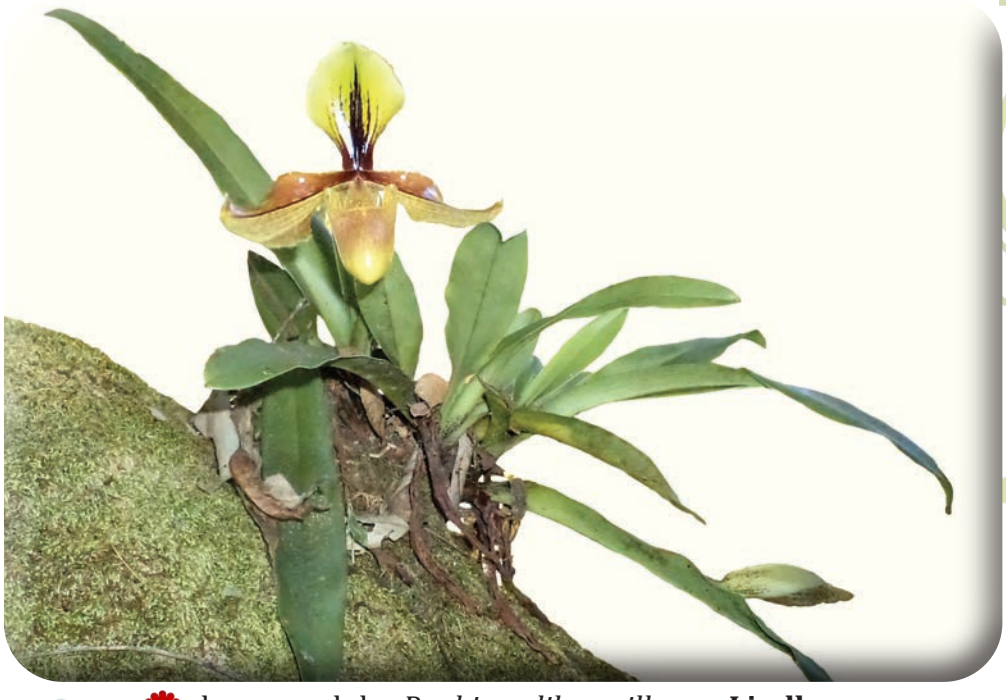
hpaw htwèe hpah nyeh nyāw - *Luisia macrantha* **Blatt.**

hpaw htwèe mẹh = *Micropera rostrata* **Roxb.**

hpaw ga pāy - *Otochilus albus* **Lindl.**

hpaw thoo gẹe - *Ornithochilus difformis* **Schlechter.**

hpaw mù ay - *Oberonia falconeri* **Hook.f.**

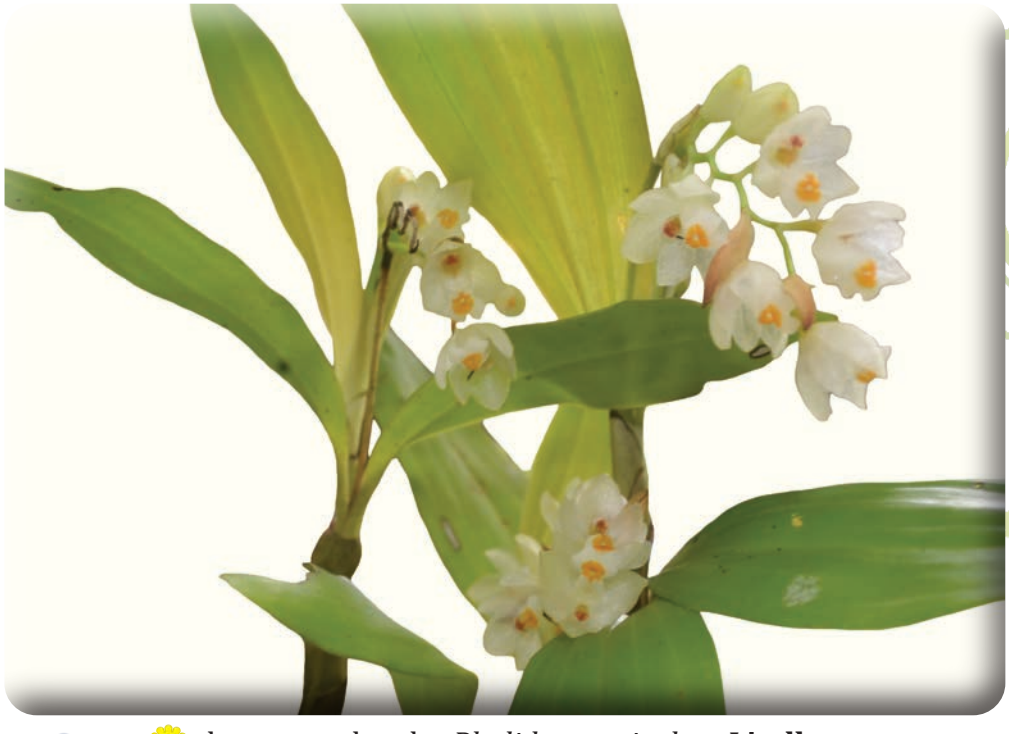


hpaw nạ duh - *Paphiopedilum villosum* **Lindl.**

hpaw say thày - *Pholidota convallariae* **Hook.f.**

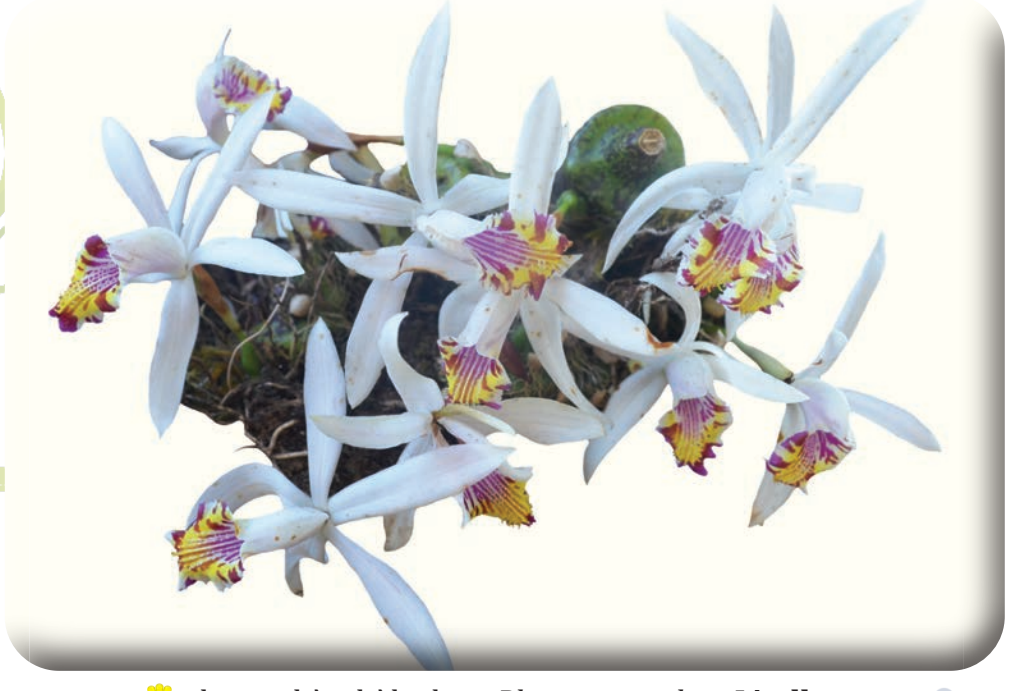
hpaw thoh là baw - *Panisea tricallosa* **Rolfe.**

hpaw thoh là - *Panisea uniflora* **Lindl.**



hpaw pạy bweh - *Pholidota articulata* **Lindl.**

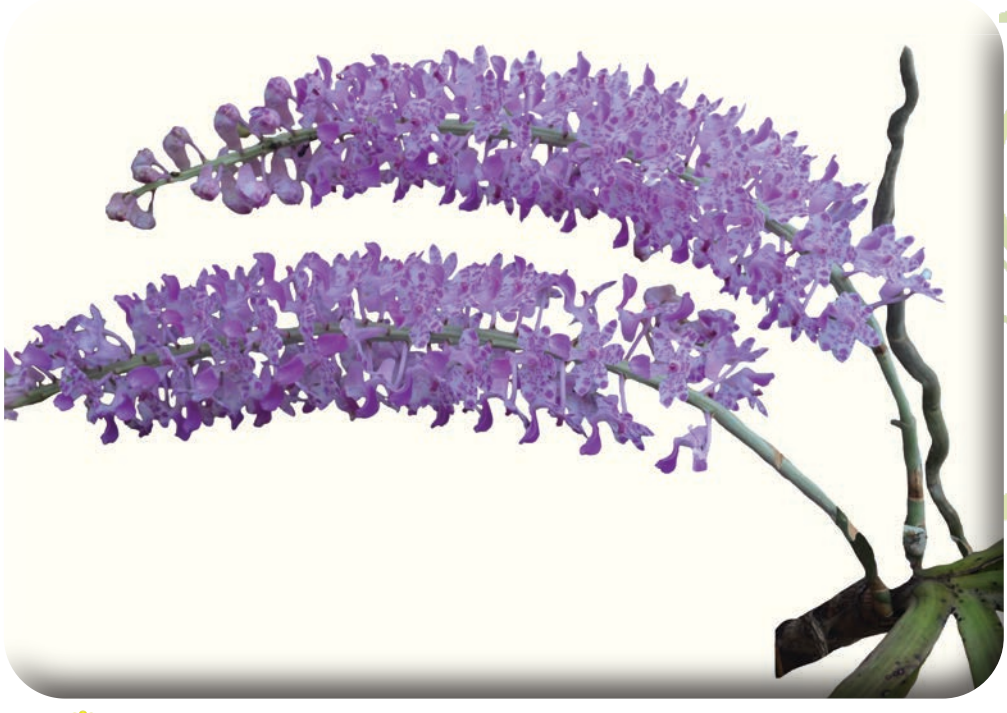
hpaw gạ plọh - *Pinalia stricta* **Lindley.**



hpaw thày hòh day - *Pleione maculata* **Lindl.**

hpaw htòh gèe nọh
Porpax lanii **Seidenf.**

hpaw htòh göh ga nuh
Thunia alba **Lindl. Rchb. f.**



hpaw htwèe mẹh pọh peh - *Rhynchostylis retusa* **Blume.**

hpaw hu nëe - *Schoenorchis gemmata* **Lindl.**

hpaw pa sāw htee - *Smitinandia micrantha* **Lindl.**

hpaw ta hsèh gòh baw plāy = *Sunipia rimannii* **spp (Unknow)**

hpaw dä baw - *Thrixspermum centipeda* **Lour.**

hpaw thee ta moo lah - *Vanda coerulea* **Griff.**

hpaw thee ta moo hkä - *Vanda bensonii* **Bateman.**

In Memory of Saw Oh Moo

A Karen Indigenous Right Activist shot and killed by Burma Army in his village Lermuplaw, Mutraw District, Kawthoolei.

Saw Oh Moo, also known as Wah Ler Paw Pa, was born on June, 1975 at Lermuplaw Village Tract, Luthaw Township, Mutraw District, Kawthoolei, Karen State. On April 5, 2018, 5:20 pm he was shot and killed by Burma Army when he was on the way home at the age of 42. His dead became a big lost for both Karen Indigenous People and Karen Environmental Social Action Network (KESAN). His dead body disappeared forever no one know where it was kept.

He married Naw Paw Tha on 2003 and had 7 children after 15 years of marriage. He worked as a Karen Indigenous Biodiversity Research Lead from 2006, and until he was killed in 2018.

Saw Blaw Htoo said that Saw Oh Moo was an important Karen Indigenous leader who had conducted many important activities included the Karen traditional environmental conservation, especially regarding improved knowledge about sustainable utilization of NTFP, forest reforestation and wildlife conservation.

KESAN appreciates the lifelong efforts of Saw Oh Moo in protecting the forests, promote indigenous knowledge and providing essential resources to the Karen people, and sharing his wisdom with new generations. He will be greatly missed.

Just as weaving looks prettier with decorations,
flowers give fragrance and color to give people beauty.

Just as an orchid sticks to the tree until it dies,
true friends will never leave each other.

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