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TPC

"A Report on Orchid Survey"

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ABSTRACT

Myanmar situated in South-East Asia and the second largest country among ASEAN nations, after Indonesia. It is the only country in the South-East Asia with all year round snow-capped mountains in the north, which make up the southern tip of the Himalayas. Myanmar supports a high diversity of habitats due to wide variation in latitude, altitude and climate within the country. The forest cover of Myanmar is still 47% of total land area greater than in some other countries of the region, however, Myanmar also faces some threats on its flora and fauna. .

The highest levels of plant species richness including Orchids are supported by Myanmar Forest Ecosystem; Montane forests in the north of the country and lowland evergreen forests in the south consist of most species rich areas. Orchidaceae, Zingiberaceae and Dipterocaceae are the highest species diversity families in Myanmar Forest Ecosystem.

There are between 700 and 800 orchid species currently recorded in Myanmar which is fairly low number compared to the other countries of the region. In the summary checklist for the Orchidaceae in Myanmar prepared by Kew Gardens in London, U.K shows that 134 Orchid genera which accounts 745 species and out of the 90 species are endemic. Myanmar Forest Department officially recorded 841 native orchid species. Although Myanmar Orchid Flora is rich and diverse, however, it is one of the most poorly known and less explore on the Asian Continent.

Taninthayi Nature Reserve (TNR) was established and legally notified by Ministry of Environmental Conservation and Forestry (MOECAF) on the 30th of March, 2005 with the aim of conserving tropical lowland evergreen forests and their constituent biodiversity in the Taninthayi Region of southern Myanmar. This Nature Reserve encompasses approximately 1,700 square kilometers (657 square miles). Although the flora diversity is rich in TNR, unfortunately, the information and data concerning on Orchids are completely unknown and unsurveyed. Therefore, orchid survey was conducted in TNR to take scientific findings for status and existence of native orchids in their habitat. Besides this, the work also aimed at improving the knowledge of the orchid conservation for the benefit of local communities.

There are four orchid surveys conducted between 2011, March and 2012, November resulted in (194) collections, comprised of 50 genera and 73 species. Among these orchid species, ***Acriopsis carii, A. javanica, Coelogyne flavida, Habenaria myriatricha*** **and** ***Stereosandra javanica. A. Calanthe*** species has to be confirmed with **Calanthe** genus experts whether it is new record for Science.

Orchid conservation knowledge was distributed with power point presentation at Tharyarmon village and Michaung Hlaung old village. An orchid growing and conservation short training also conducted at Environmental Education Center (EEC) of Michaung Hlaung Camp.

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CHAPTER 1

INTRODUCTION

The Republic of the Union of Myanmar is geographically located in Southeast Asia between 9° 58' and 28° 36' North latitude and 92° 9' and 101° 1' East longitude. It is bordered in the West by Bangladesh, India and China and by Laos PDR in the northeast and the Kingdom of the Thailand in the West. Myanmar is the second largest country after Indonesia in Southeast Asia, with a total land area of (670,553) sq km and coastal line of (2832) km, it stretches (2,092) km from the north to south; and (912) km from east to west.

In Myanmar, both the Mountain ranges and the rivers extend north to south. The major rivers of Myanmar are the Ayeyarwaddy, the Chindwin, the Sittaung and the Thanlwin. The Ayeyarwaddy is the largest and most navigable river in the country and also the best for commercial communication and transportation. It is formed from the confluence of the Maikha and Malikha rivers, which flow from the Hkakabo-razi ranges in the north where highest peak (5881 km) is situated in the Hkakabo-razi National Park.

Myanmar is the only country in the Southeast Asia with all year round snow-capped mountains in the north, which make up the southern tip of the Himalayas. Myanmar supports a high diversity of habitats due to wide variation in latitude, altitude and climate within the country. The forest cover of Myanmar is still 47% of total land area greater than in some other countries of the region, however, Myanmar also faces some threats on its flora and fauna.

There are four floristic regions in Myanmar, namely Sino-Malayan, Indochinese, Indian and Malaysian (Sundaii). This floral richness is supported and governed by the Forest Ecosystem, which account for and support species diversity. The highest number of speciation is contained in the Montane and lowland forest.

Flora Information of Myanmar

The different forest types over the country as follows:

Mangrove Forests	13,762 sqkm
Evergreen Forests	55,046 sqkm
Deciduous Forests	134,122 sqkm

Dry Forests	34,404 sqkm
Scrub Forests	17,201 sqkm
High Mountain and sub-tropical Forests	

A recent revision of the check list of gymnosperms and angiosperms in Myanmar shows 11,800 species in 273 families and 237 genera (Kress et al, 2003). The available information on species diversity and Endemism indicates that Myanmar supports extraordinary parts and diversity; and levels of endemism comparable to other countries in the Indo-Myanmar Hotspot.

The highest levels up plant species richness including orchids are supported by forest ecosystem; Montane forests in north of the country and lowland evergreen forests in the south consist of most species rich area. Plant families particularly notable for them high species diversity in country are the family Orchidaceae, Zingiberaceae and Dipterocarpaceae.

As analysis by the World Conservation Union (IUCN), identified four centers of plant diversely in Myanmar. (Davis et.al). These record northern Myanmar (with an estimated 6,000 species), Taninthayi (with an estimated 3,000 species), Nat-ma-taung National Park and Chin Hills (with an estimated 2,500 species) and the Central Bago Yoma Range (with an estimated 2,000 species).

Taninthayi Nature Reserve

Taninthayi Nature Reserve (TNR) was established and legally notified by Ministry of Environmental Conservation and Forestry (MOECAF) on the 30th, March, 2005 with aim of conserving tropical lowland evergreen forests and their constituent biodiversity in the Taninthayi Region of Southern Myanmar. The Taninthayi Nature Reserve consists of pristine tropical evergreen forest and some mixed deciduous forests. It encompasses approximately 1,700 square kilometers (657 square miles).

It is located between north latitudes 14° 20’ 50” and 14°57’ 55” and east longitudes 98° 5’ 10” and 98° 31’ 32”. It comprises three districts, namely Dawei, Myeik and Kawthaung in Taninthayi Region. It includes Heinze-Kaleinaung and luwaing Reserve Forests.

In TNR, Nwalabo range and Taninthayi Yoma Range run from north-west to south-east and Myint-Mo-Let-Khat point is situated with the height of 6891 ft. Narrow coastal plain and lowland areas can be found along the Dawei River and Myeik. The islands along the coast are the upper parts submerged mountain ranges. About 800 islands of

Maungmagan, Launglon and Myeik trending parallel to the coast. The Taninthayi River flows in north to south direction between the two mountain ranges and flows into the Andaman Sea. But small Taninthayi River flows from south to north and it flows into the giant Taninthayi River.

Taninthayi Nature Reserve area is situated in Yebyu a Dawei Township. The climatic condition of TNR is tropical and seasonal monsoon type. Since TNR receives over 6000 mm annual rainfall and nearly 150 rainy days from starting date of monsoon period May to October. The rains usually commence in the end of April. The average highest rainfall 1400 mm was recorded in July and January obtained the average lowest rainfall less than 25 mm. The average temperature recorded between 25°-28°C. The hottest month of TNR is March and very short period in cool weather is in January alone. It was recorded the average maximum temperature as 37.4°C and the average temperature as 25.53°C.

Most of the southern parts along the Thai border are mountainous in TNR. The mountain ranges from north and south however the slop rises from west to east towards the ridge top. The terrains in lowland area is 15 meters above sea level and it rise to 1400 meters at the ridge of Myanmar-Thai border.

There are three geological formations in TNR; (a) granite intrusion, (b) sedimentation rocks and (c) recent and sub recent alluvial deposits. (H.C.Smith 1926).

He also reported that seven different forest types; giant evergreen forest, sub evergreen forest, moist deciduous forest, reverine forest, dry deciduous forest, hill evergreen forest and tidal forest could be categorized in TNR. Francis H.J. Crome (1995-1996) reported that the type vegetation along the Yatana Gas Pipe-Line comprised eight types of vegetation. Another researcher, National Consultant U Hla Maung Thein (2007) reported that Tropical rain forest covered almost TNR areas in high elevation of High Mountain; however the lowland areas were covered by deciduous land wood and bamboo forest.

National Consultant U Nyo Maung (2011) confirmed that the types of vegetation in TNR include evergreen forest, deciduous forest and reverine forest. He reported that hill evergreen forest covered in high elevation of the mountain up to 1000 ft to 2000 ft. he also said that the giant evergreen forest distributed under the elevation of 1000 ft above sea level.

It is clearly noted that the vegetation in the TNR still distribute as described by Smith (1926), over 85 years ago. But due to human settlement, illegal logging and plantation, land cover and land use have been charged over time.

Objectives of Orchid survey

The main objective of the orchid survey in TNR is to record and identifies the native orchids in the Taninthayi Nature Reserve.

Tasks :

- To collect native orchid live specimens as much as possible.
- To grow the collected orchid plants in TNR nursery for the further identification and conservation.
- To prepare herbarium specimen sheets and spirit bottles collection of each collected orchid specimen.
- To survey the distribution, ecological data and status of native orchids.
- To find out the usage of native orchids by local people.
- To find out the rare and unusual orchids in TNR.
- To import and share the orchid and its conservation knowledge to TNR staff and local people by means of short training and tails.
- To help for publishing the native orchid conservation poster and brochure.
- To provide orchid exhibit materials such as herbarium sheets, spirit bottles collections and photos for TNR Museum.
- To prepare and submit the regular report and final report on orchid survey in TNR.

CHAPTER 2

LITERATURE REVIEW

2.1. Orchidaceae (The Orchid Family)

2.1.1. Diversity

Orchids are the most "cosmopolitan", diverse and also one of the most advanced families of flowering plants. Estimates of the total number ranges from 20,000 to 35,000 in five sub-families (Dressler, 1993; Mabberley, 1977). This represents about ten percent of the world's flowering plants. The epiphytic orchids and terrestrials comprises 725 genera and the majority (75%) belong to the former and the rest to the latter.

2.1.2. Distribution

The distribution ranges from deserts and semiscrub, rain forests, montane and cloud forests, to tundra ecosystems, but, they are most abundant in the tropical jungles of Central and South America, Southeast Asia, and the islands of the Pacific rim. An orchid paradise, Papua New Guinea with 3000-3500 species is recognized as the richest in orchids on the planet (Botanica's Orchids, 2002).Central America also has approximately a quarter of all known species.The topography and geography of the area combine to sustain this huge number .

These equatorial regions receive high annual rainfall and equable annual temperatures and altitudinal variation. They also have rugged terrains and mountains which give rise to habitats of low and high -land (montane) climates. As lowland rain forests have fewer species than those of higher altitudes. Two optimal conditions; increased available light and better air movement enhance more orchid density in high mountain regions. Different types of epiphytes grow on different parts of the trees. The larger survive on the major branches, and the smaller species are confined to the outer

peripheral branches and are known as “twig epiphytes”. Some species such as *Pleione* grow among the mosses or in clumps of peat formed by epiphytic ferns on tree branches.

Although the number of species is not high, some of the finest and most beautiful epiphytic orchids inhabit dry forests in savannas, such as *Ansellia africana* in Africa and *Dendrobium bigibbum* from Northern Australia are good examples of those which thrive very well in dry forests. In North America and the whole of Europe, numerous terrestrial orchids with underground storage organs grow well on temperate meadows, grasslands, bog and swampy areas. The orchid species in grassy habitats flower more abundantly after a forest fire.

Gramatophyllum speciosum from Southern Asia and Papua New Guinea is the biggest orchid in the world has massive thick stems up to nearly 3 m long. Several species of *Bulbophyllum* have been listed among the world’s smallest, however, *Platystele jungermannioides* from Central America has been recognized as being the tiniest. *Dendrobium steatoglossum* (New Caledonia) and *Selenipedium chica* (South America) may sometimes reach up to 5m high have been accepted as being the tallest.

Orchids are the most diverse and abundant in habitats ranging from area with over 100 inches (about 2500 cm) of annual rainfall (Holttum, 1960). Dressler (1993) found that the greatest abundance and diversity of orchids are found in wet montane or cloud forests from 1000 to 2000 m altitude while he had also counted 60 to 100 different species on a single tree in the Panamian montane forest. Duntterville (1961) found at least 42 different species of epiphytes on one tree in the Venezuelan montane rain forest.

2.2 History

The Chinese word for orchids, “Lan” appeared in their herbal literature 4,000 years ago. The history of orchids can be traced back to the Chinese philosopher “Confucius” Hung-Fu-Gi (pronounced in Cantonese) 511- 429 BC. About 2,000 years ago, he had described *Cymbidium ensifolium,* “Gog Lan” and its fragrance in botanical manuscripts, (Reinikka, 1972). The Chinese regarded its fragrance as “King of All Fragrances” or “Fragrance for Kings”, (Fung, 1999). Many well-known poets and politicians have mentioned “Gog Lan” in their classical literature. In classic literature, “Gog Lan” was often referred to as a person of wisdom, morality and power who however chose to live a humble life as a hermit away from worldly life. The orchid in Chinese culture, much the same as other ornamental plants such as the plum, chrysanthemum and bamboo has always held a symbolic role. The above were referred to as the Four Genteel as a symbol of power, inner goodness, wisdom and morality. Various species of *Cymbidium* as well as *Derdrobium moniliforme* and *Bletilla striata* have been illustrated and described in Chinese writing since 800 B.C.

In Europe, the earliest known interest in orchids dated back to the ancient Greeks. The paired tubers of the terrestrial species were thought to resemble testicles, for which the Latin is *Orchis* led to orchid and Orchidaceae. The father of Botany in the Western World, Theopharastus mentioned *Orchis* in his “Enquiry into Plants” around 300 B.C. *Vanilla* appeared in the 16^{th} century Badianus Manuscript. The 17^{th} century accounts of European orchids appeared in the early herbals.

Orchids were introduced into cultivation in Europe in the middle of the 18^{th} century . The first cultivated orchid “*Cattleya labiata*” flowered by William Cattleya in 1818. The pseudobulbs of these orchids were from the Organ Mountains near Rio de Janeiro, Brazil, were used as packing materials for other ornamental plants, and *Cattleya* grew them in his glasshouse, then called “stove”. When it flowered, he showed it to the renowned botanist and taxonomist John Lindley, who then named this orchid genus in honor of Cattleya.

Orchid-growing gradually became popular among the well–to–do who could afford a glasshouse and heating facility. Unfortunately, most of these early imported orchids had a short life as a large number of them died during the long journey from America and Africa. As a result orchids died by the thousands so, the taxonomist and director of Kew Gardens, Joseph Dalton Hooker, commented that "England is the graveyard of tropical orchids". By the end of the 19^{th} century, orchid growing was a less risky and popular hobby for those who could afford the price of wild collected plants.

In 1812, Conrad Loadiges established an orchid nursery and importing service; other major firms followed suit. Among them are James Veitch &Sons and Frederich Sanders. They employed professional orchid hunters who lived abroad and sent huge quantities of orchids, back to England on a regular basis to meet the high demand of that period. During the 20^{th} century, this hobby has declined due to the high cost of collecting and shipping, glasshouse maintenance and associated factors.

Orchid growing as a hobby and cut flower trade were reactivated by the work of Bernard and Burgeff (1975) on symbiotic germination of orchid seeds and on asymbiotic germination by Knudson (1949). Following the second World War, the international orchid trade has been introduced and dominated by English, French and American firms. In 1960, George Morel from France introduced tissue culture or mericloning method and was successful with *Cymbidium*. Since then, many other orchid genera have been propagated and multiplied by this technique. Propagation by meristeming or mericloning and flasking have brought down the price of orchids so it is within the reach of everyone.

2.3. History of Orchid Collection in Myanmar

Due to varied climatic conditions and altitudes, Myanmar is endowed with a great diversity of wild orchid species. The country within the Indo-Malayan Realm lies and contains three ecological subregions; (a) the Indian in the West, bordering Bangladesh and India; (b) the Indochinese in the north, along the border with China; and(c) the Sundiac in

the south adjacent to Thailand. These three subregions contain diverse geographical features, which are among the biological reservoirs in Asia according to World Bank Technical Paper Number 193 (2002). Myanmar possesses a vast wealth of orchid species in its seven states and seven divisions. The orchid belt encompasses the Himalayan temperate montane, tropical rain forests, evergreen and deciduous forests in the north. Native orchids can also be found in the mangrove and tidal forests along the delta and coasts.

The history of orchid hunting and collection in the country can be traced back to 1843. Orchid enthusiasts, hunters and traders have been interested in our orchids since the 19th century. In 1892, Wallis first exported Myanmar orchids to Europe; introduced the blue Vanda, *Vanda coerulea* to England. Due to over collection and habitat degradation, this species has declined in the wild. In 1860, a Catholic Reverend, Charles Parish came here and stayed for about two decades in Mawlamyine. He collected many varieties of orchids and sent them for identification to Kew Gardens. Many native orchids, *Paphiopedilum parishii*; *Dendrobium parishii*; and *Vanda parishii* (now *Hygrochilus parishii*) were named after him. Parish traveled far and wide in the area and he discovered many new species.

The annexation of part of lower Myanmar by the British in 1862 coincided with the renaissance and increasing interest in orchids in Western Europe.British Colonel William Benson (1866 – 1868), collected orchids in Tanintharyi and Yakhine Yoma areas' under his command and sent them to Europe. He studied and discovered the chocolate and blue *Vanda* in the Chin Hills, and this new species *Vanda bensonii* was named after him.William Griffith the botanist arrived here in 1873, collected and sent many orchids back to Euope. In addition to orchids, Helfer, William Hooker and Professor Reichenbach contributed to the flora.In 1895, Captain Bartle Grant of The Border Regiment (Adjutant, Rangoon Volunteer Rifles) compiled all the papers about Myanmar orchids written by various writers and published "The Orchids of Burma". It recorded 85 genera and 592 species;

although the above book had been published more then a hundred years ago, itstill proves to be very useful and forms a good reference for orchidologists and orchid enthusiasts.

During the 20th Century, the well-known botanist and naturalist Frank Kingdon-Ward had conducted several floristic surveys in the Kachin State. Since 1917, he discovered many new orchid species from the above area. In 1920, he discovered a new speices of ground orchid in Naung Mung area and this was named *Paphiopedilum wardii* in honor of him. This species is endemic to Myanmar and has been accorded an endangered status and listed in CITES Appendix (I). Locals call this orchid "the Black Orchid" because of the dark maroon flowers.After independence, Kingdon-Ward came and collected in the Kachin triangle area between Maihka and Malikha(previously an unknown area)and the Chin Hills in 1953 and 1956. U Chit Ko Ko and U Tha Hla from the Myanmar Forest Department accompanied the botanist on the above trips.

Since then, permission is required by foreign botanists to enter the Myanmar forests. However, U Kyaw Nyunt, Manager of the Burma Orchid Nursery and a well-known orchidologist and his staff have made some orchid expeditions to the Kachin, Shan and Chin States and in 1978 they rediscovered *P. wardii* in the Naung Mung area.

Nowadays, many orchid species are being driven to extinction by either direct or indirect human activities. With varied ecological complexity and their worldwide popularity , orchid conservation is urgently needed while the pressure on the natural environment increases daily.

Two types of human activities : habitat alteration or destruction derived from changing the area of land, and extraction of wild plants for trade have been considered the major causes of orchid extinction. Habit loss is considered the main threat to most species. On the other hand, collection for trade affects a limited number of species especially those with very showy flowers or which are edible or have medicinal value (e.g. *Dendrobium* and *Vanilla* species).

Rabinowitz et. al (1996) reported that the degree to these threatening factors affect each orchid species varies according to geographical distribution, habitat, specificity and population size which provide a basis for estimating the relative variety of orchids and other plant species. It can be assumed generally that the smaller the geographical distribution and population size, the more specific its habitat preferences, the rarer the species.

Many rare orchid species have one or more of the criteria mentioned above. Tremblay and Acherman (1993) reported that most *Lepanthes* spp. are found on only one island in the Antilles. Most of the several hundred species of the neotropical genus *Lepanthes* have restricted geographical distribution and are inhabitants of montane forests. In Mexico, 52 of the 60 species of the above genus are restricted to a single mountain range (Salazar & Arenas, 1994), although their populations consists of a large number of individuals. Arenas et.al (1990) reported that the recently discovered *Phragmipedium xerophyticum* survive in the only human locality with seven plants. The species thrives in a very specialized habitat : dry scrub with *Agave, Beaucarnea,* cacti and several other xerophytes on limestone outcrops in an evergreen tropical forest. They suggested that the habitat is very rare , and continuous research is required to determine whether any other similar locality containing *P. xerophyticum* exists in the region. It is suggested that rare plants are more prone to extinction that those which are “common”. Species with small populations and those with a narrowing geographical area may perish as a consequence of natural catastrophes such as volcanic eruptions, extensive forest fires or unusually severe climatic changes. (Salazar, 1996.). Hágsater (1993) reported that the epiphytic orchid species, *Epidendrum floridense* appeared to be nearly extinct as a consequence of severe frost affecting southern Florida in recent years.

Even relatively common species may be threatened as a result of extensive habitat destruction or over- collecting. However, it is safe for them in a refuge, should they inhabit inaccessible locations, areas that are unsuitable for agriculture e.g. some rugged valley

mountain top areas, in the absence of human development and settlement, or in effectively protected areas and nature reserves.

2.4. Conversation Threats

The main threat to biodiversity of the flora and fauna is widely recognised as habitat alteration; this including destruction, modification and fragmentation, affecting the highest levels in the tropics, where orchid diversity is greatest (Dressler, 1981).In 87 tropical countries, within only one decade (between 1981 and 1990), the average annual deforestation rate (0.9%) (170,000 sq km) ranged from modification to complete destruction (World Conservation Monitoring Centre, 1992). Due to increasing population and the resulting human encroachment, the above rate is bound to get worse. Gentry (1977) reported that coastal forests contain highly diverse habitat types with many endemic flora including numerous orchid species and such habitats in Ecuador have been almost completely destroyed within two decades. He also stressed that comparable situations can be expected throughout the tropics. Most tropical orchids are found in primary forests, however , many also thrive along forest edges as well as in marginal or disturbed areas.

Some orchids are naturally rare and confined to limited areas and certain geographical ranges. Cribb et. al (2003) reported *Phragmipedium exstamisodium* (30 no.) and *Mexipedium xerophytium* (11 no.) from Mexico, *Calochilus richiae* with less than 20 plants in its native area and only three plants of *Paphiopedilum rothschildianum* have been recorded on Mt. Kinabalu. The above situation is critical and when these forests are destroyed, then such endemic taxa would disappear completely from the face of the planet.

Forest clearing is a result of logging and opening of new areas for livestock and agriculture. World deforestation also results from gathering of firewood by the locals in undeveloped regions (Salarzar, 1996).

2.4.1 Logging

Habitat destruction caused by selective logging of valuable timber species and wholesale depletion of areas by commercial concessions in most tropical and South American countries forms the major threat to orchids. It significantly affects and modifies height intensity, humidity and other microclimatic factors which govern the survival of both terrestrials and epiphytes as well as the soil ecology and the mycorhizal relationships between fungi and orchid seeds (Salarzar, 1996). Cattleya Labiata and Sophronitis coccinea and other species are severely threatened in Eastern Brazil remains only 4% of its original forest area (Miller and Warren, 1996).

In Sumatra, all the lowland forests have perished through logging within three years and even the montane have become fragmented (Cribb et.al, 1996). In Indonesia, logging legally or otherwise, have resulted in 2 million ha being cleared annually (FWI / GFW, 2002). Most of the delicate, shade-loving epiphytes and terrestrials of the under story have been eliminated because of the absence of their necessary tree cover.

Annually, thousands of acres of the Amazonian forest have been cleared for commercial pulp and paper production. Due to this, more than half of the above jungle have completely disappeared from the face of the earth. The proposed Trans- Amazonian Highway would also result in further depletion of this rich heritage, as it would clear a huge north to south swathe through the remnant primary forest.

2.4.2 Agriculture and Plantation

Many forests of our planet, have been converted to agriculture and large commercial plantations such as those covered by rubber, coffee and palm oil. Shifting cultivation has also converted many forested areas, to rice and annual crops. Food crops are grown for a few years, the areas then abandoned for a number of years before being utilized again. Shifting cultivation has been a common practice in tropical Asia and Africa (World

Conservation Monitoring Centre, 1992). This accounts for 70% of the forest loss in Africa, 50% in Asia and 35% in South America. Evidence showed that loss of diversity is caused by the substitution of the native flora by extensive plantations of single species (Salarzar, 1996).

2.4.3 Urban development

New human settlements and urbanization are major threats to indigenous orchids in central Europe whose cities are densely populated. In Ecuador, the population almost quadrupled from 3.3 million in 1950 to more than 12.6 million in 2000 (World Resource Institute 2001). Dodson and Escobar (1994) reported that in Ecuador, 13,000 km of roads in 1951 increased to more than 40,000 km by 1991. This kind of Highway system has directly altered and affected the flora.

2.4.4 Mining

Miranda (1990) reported that in Brazil, *Laelia millerii* which is restricted to iron-rich area runs the risk of completely disappearing in the wild as a consequence of mining and its resultant contamination of the habitat. Accessibility to the areas created by mining and oil exploration companies has also resulted in a drastic loss of forest cover.

2.4.5 Collecting

Over–collection for the horticultural trade is a major cause of decline of many showy and unusual orchid species.

In the 1980s, thousands of Chinese *Paphiopedilum*, *P. armeniacum*, *P. micranthum*, *P. malipoense* and *P. emersonii* have been targeted in Southeast Asia. Many species of this genus have been over-collected and shipped to Hong Kong and re-exported illegally to United States, Germany and Japan. Field reports mentioned that at least some of the above are now nearly extinct in the wild (Pridgeon, 1998).

Paphiopedilum spp. are naturally rare and grow restricted geographically with narrow habitat preferences (Salarzar , 1996). Cribb (1987) estimated that 25 (over 40%) of the 60 species are seriously endangered in the wild.

Data from the international orchid trade shows that the average annual number of plants traded during 1963-1989 was nearly five millions (World Conservation Monitoring Centre, 1992). Eighty percent of the orchids traded were propagated hybrids, however, wild specimens are still in demand.

Orchid growers initially took interest in showy hybrids, and then many gradually develop into an absorbing hobby involving wild species. They can also be species devotees who are experienced and well-informed, respecting nature and conservation. Others involved in hybridization select and nurture only those with the most horticulturally distinct or outstanding characters, thus, indirectly contributing to the improvement of the quality in cultivation.

Eager and enthusiastic orchid-lovers tend to over-collect in the hope of mutual exchanges and augmenting personal collections.

Large scale collection of orchids is important as medicines and also for consumption. In Turkey and adjacent Mediterranean countries, terrestrial orchid tubers are used for salep (jelly) which is used for flavoring a hot drink and for texturing ice-cream. It had also been traditionally used as food, restorative, tonic and aphrodisiac (Arditti, 1992; Salarzar, 1996). In Turkey alone, over 16 million plants belonging to 38 species are collected annually for salep. So, commercial salep production endanger the terrestrial orchids of the country (Arditti, 1992). Traditional or folk medicines also used orchids. There are a number of orchid species that are locally collected and used in traditional or folk medicine (Handa 1986; Arditti 1992), however, no data is available concerning the numbers of plants.

The Chinese have from time immemorial used floral and faunal organs as medicines. Since the last two decades, China has increasingly imported (more illegal than legal) these natural resources from adjacent and neighbouring countries. The prospect of extinction or disappearance of the flora and fauna involved increases with time.

2.5 CITES for Conservation

Orchid species are protected under national legislation in many countries. Since the 18^{th} century, people and international trade started to develop an interest in this family. Nowadays, most of the native species have almost been collected to extinctions. Conservation threats have not been confined to orchids alone, but involve many other plant and animal species. During 1960s, several NGOs and individuals including IUCN (International Union for Conservation of Nature & NaturalResources) took the initiative to create an international awareness which conserve the species in international trade through control. In 1993, CITES (The Convention on International Trade in Endangered Species of Wild Flora and Fauna) was signed and entered into force on the 1^{st} July, 1995. CITES is the international legal framework for not only the preventive tool of trade but also an effective umbrella covering other aspects related to the above. It give s producer and consumer countries their share of the joint co-operation in fulfilling their responsibility for international co-operation. This convention was created to regulate international trade of wild species that were or may become threatened with extinction. CITES permits trade for species which are less endangered but could become threatened if trade is not controlled. Since 1997, Myanmar signed and became a member of CITES, and the Forest Department have been exercising and issuing CITES permits according to rules and regulations of the convention. As of May 2002, 158 nations signed and participated in the convention.

A total of 38,000 species of plants and animals are covered by the convention. The plant category comprises 25,000 species and it accounts for about five times the number of animals. All orchids are included in the CITES Appendices, accounting for the majority. CITES Appendix (1) includes the following orchids : *Cattleya trianaei, Dendrobium*

cruentum, Laelia jongheana, L. lobata, Peristeria elata, Renanthera imschootiana and the genera *Paphiopedilum* and *Phragmipedium. Vanda coerulea* used to be included in CITES Appendix (1) until down-listed in November 2004. All other orchids are included in Appendix(2) and the condition for their trade and collection from the wild or when artificially propagated, is subject to the granting of permits or the certification of artificial propagation. CITES was not meant to completely prohibit trade of wild flora and fauna; but its goal is to regulae and prevent unsustainable exploitation leading to extinction. The wild species of Appendix (1) cannot be traded internationally for commercial purposes; however, those artificially propagated are permitted.

If a species is found to be traded extensively without any conservation, proposals can be submitted to up list it from Appendix (2) to Appendix (1). These proposals of inclusion, deletion, or other amendments to the Appendices were made by the parties to the convention to be discussed and approved by the conference held every two and a half years. The whole orchid family was included in CITES Appendices because of the difficulty involved in defining threatened and non-threatened species. Appendix (3) does not include any orchids. All hybrids are also covered by CITES, and need its permit for trade.

The Orchid Specialist Group (OSG) of the Species Survival Commission (SSC) of IUCN consisting of researchers, enthusiasts, growers and conservationists was formed in 1984.

2.5.1 Conservation : *In-situ*

The most effective means of conserving orchids is to protect their habitats (Dressler, 1981). Populations can be managed effectively within small areas by landowners, horticulturists and members of conservation NGOs. The popularity of orchid in general could help in developing an understanding and thorough knowledge of the habitat and all other associated aspects of the ecology.

Convention on Biodiversity (CBD) acknowledged that *in-situ* conservation should always be given priority, while *ex-situ* activities should only be viewed as secondary to support the former and it could never replace it. A number of nature reserves, national parks and conservation areas that have been established around the world have their effective and important role in habitat conservation for both flora and fauna.

2.5.2 Conservation : *Ex-situ*

Although rare orchid species remain in danger of extinction in the wild as their habitat is destroyed, they can be salvaged in *ex-situ* conservation, particularly in seed banks (Koopowitz and Thornhill, 1994) and micropropagation techniques (Arditii and Ernest, 1993), Cryopreservation technique (Thammasirn, 1999) and botanic garden collection. The Royal Botanic Gardens, Kew (RBG) has recently established the millennium seed bank and in partnership with the countries of origin is collectingseeds including orchids for long-term storage (Cribb et.al. 2003). The role of *ex-situ* orchid collection could be improved through a globally coordinated plan to produce a data base of species, which would be useful for the conservation of rare and threatened species, including reintroduction programmes. Botanic gardens and research centers could function as repositories for orchid collections.

Trade in seedlings, young plants, flowering pot plants, cut flowers and orchid seed pods (e.g *Vanilla*) constitutes a significant contribution to the economy of many countries. Artificial propagation reduces the demand for wild plants; it also contributes better clones from selected quality plants. Therefore the collection in the wild locally and for export has greatly diminished, compared with the trade in these plants a century ago. Artificial propagation of more endangered species is a great step in orchid conservation and should be encouraged at all levels of *ex-situ* conservation.

CHAPTER 3

MATERIALS AND METHODS

3.1 The collection of native orchids growing naturally in the forest and along the small foot paths, near the river bank, stream and all possible places during the four survey routes in TNR appears in Fid.

3.2 The habitat and locations of specimens were determined by using Garmin 12x2 Global Position System (GPS) Device.

3.3 All the specimens were photographed digitally and also in colour prints, measured and record their habitat, inflorescences, and distinctive floral patterns and color in field note books.

3.4 All collected specimens were made into herbarium sheets and some flowers where available were preserved in 70% methylated spirit.

3.5 All live specimens were labeled, potted (or) hanged on tree branches and grown in the Michaung Laung EEC nursery.

3.6 All orchids were identified according to Hooker (1885), Holtum (1964), Seidenfaden & Wood (1992) and Vaddhavnaputi (2001).

Information on usage, local name, trade, selling price, plant distribution were gathered and collected by interviewing local people, elders, and officials from TNR.

3.7 Orchid Survey Trips in TNR.

3.7 (1) First Survey (23.3.2012) t0 (5.4.2012)

Yebone, Sakhan Gyi area and Service Track Road.

3.7 (2) Second Survey (15.6.2012) to (28.6.2012)

Heinze-Luwiang Chaung area, Mayan Chaung area, Tharyar Mon village and Raphu old village surrounding area.

3.7 (3) Third Survey (0.9.2012) to (21.9.2012)

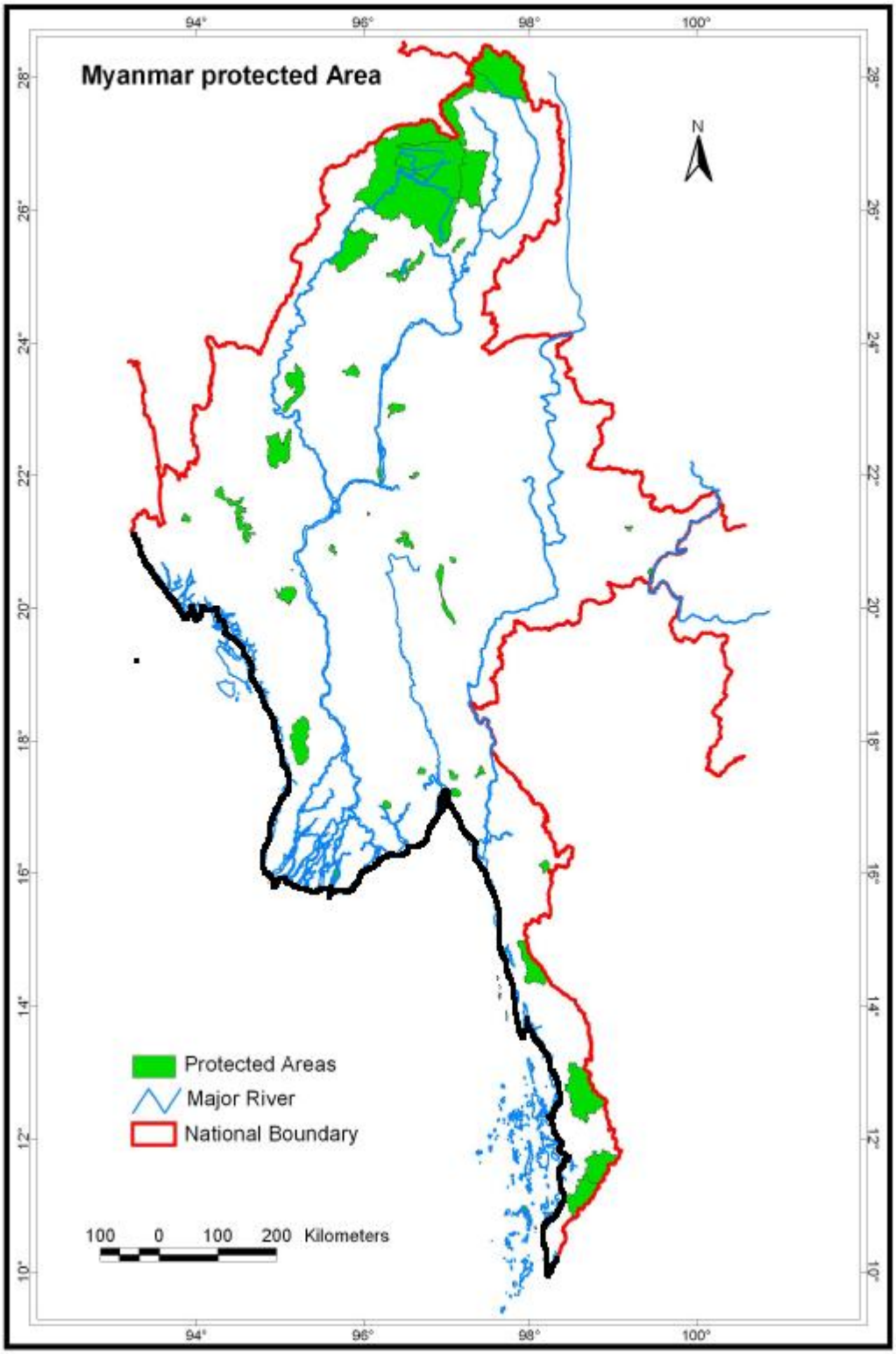
Two orchid conservation talks held at Tharyar Mon village (11.9.2012) and Michaung Laung old village (20.9.2012).

Two days Orchid Growing and Conservation Training was conducted for TNR staff, local NGOs and villager in EEC, Michaung Laung on (12.9.2012) and (13.9.2012).

Orchid Survey also conducted at Koe sint (Nine steps waterfall), Michaung Laung old village and adjacent area, Yaekan Taung trip.

3.7 (4) Fourth Survey (20.11.2012) to (29.11.2012)

Ye Kan Taung Dam area, Kalone Tar area and Oarttaran area were surveyed.



Fig(1) Map showing Myanmar Protected Area

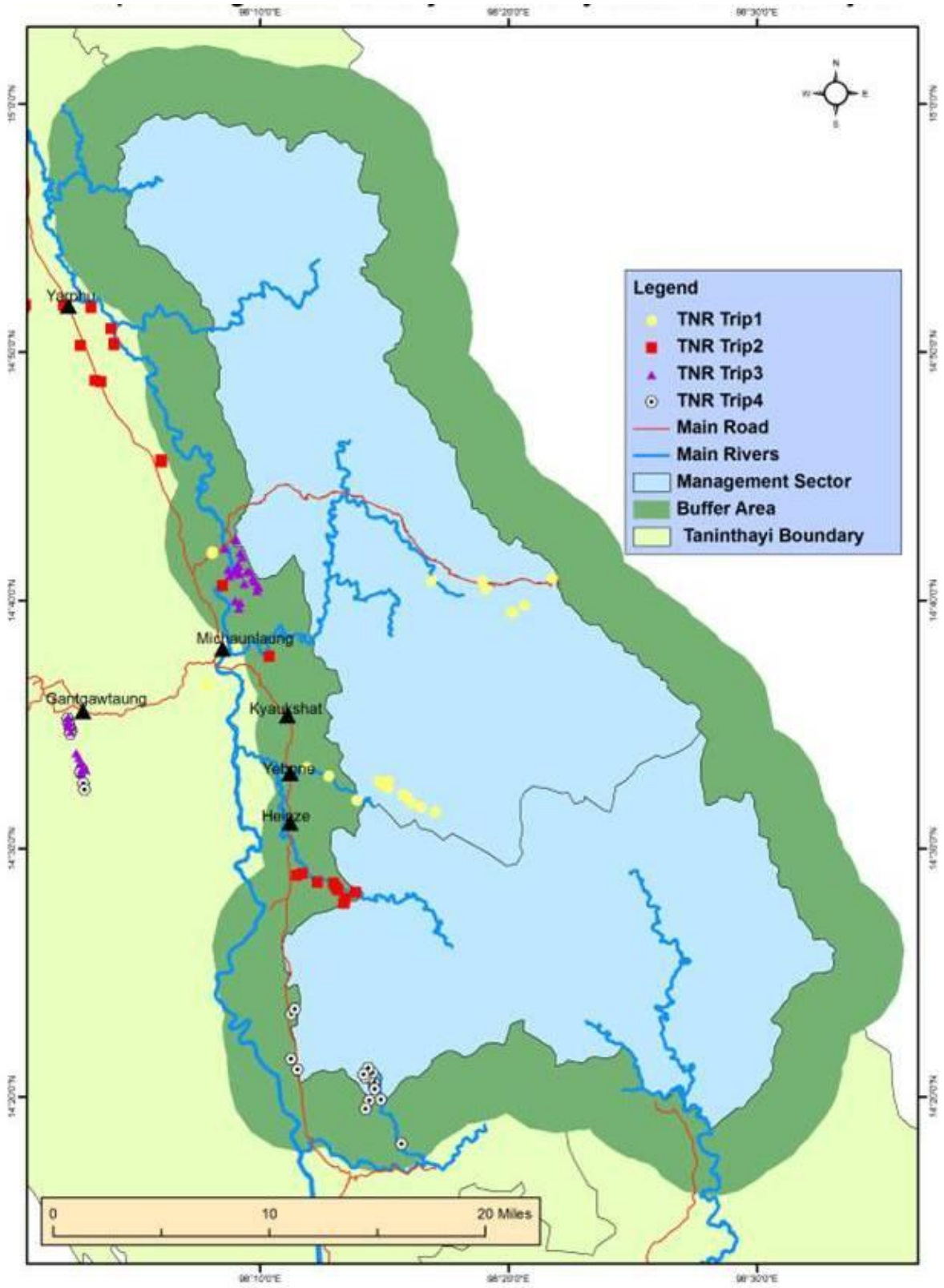
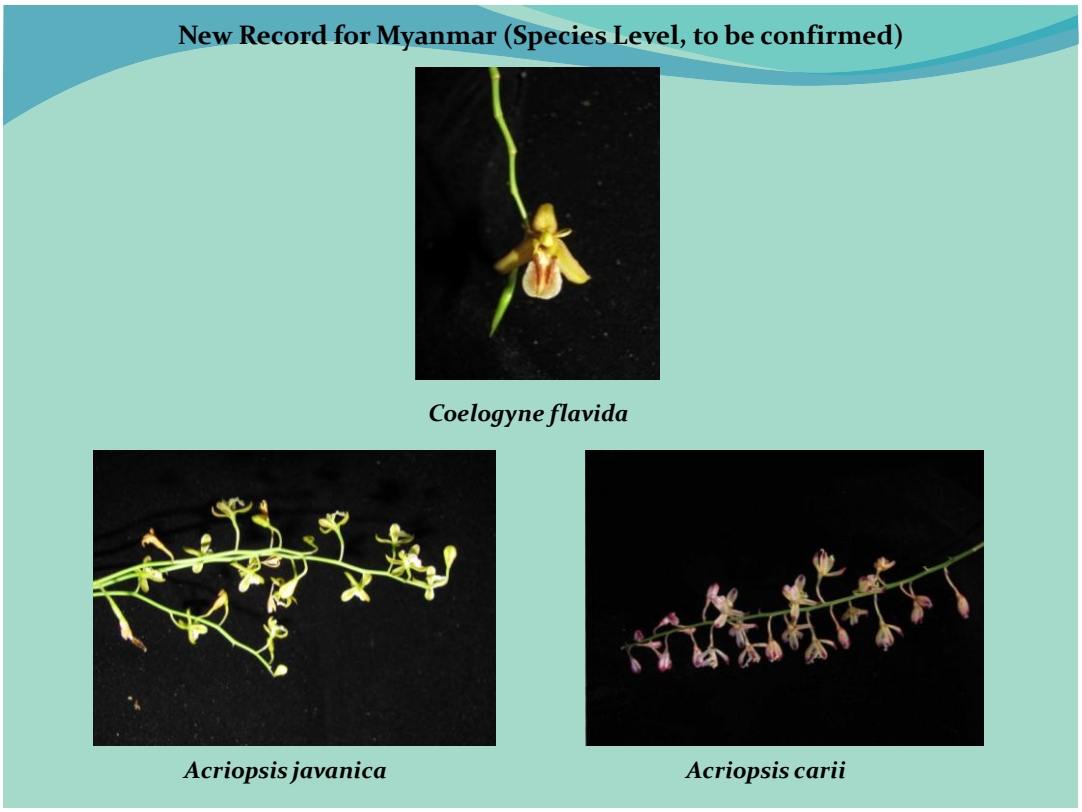


Fig.(2) Map Showing Orchid Survey in Tanintharyi Nature Reserve



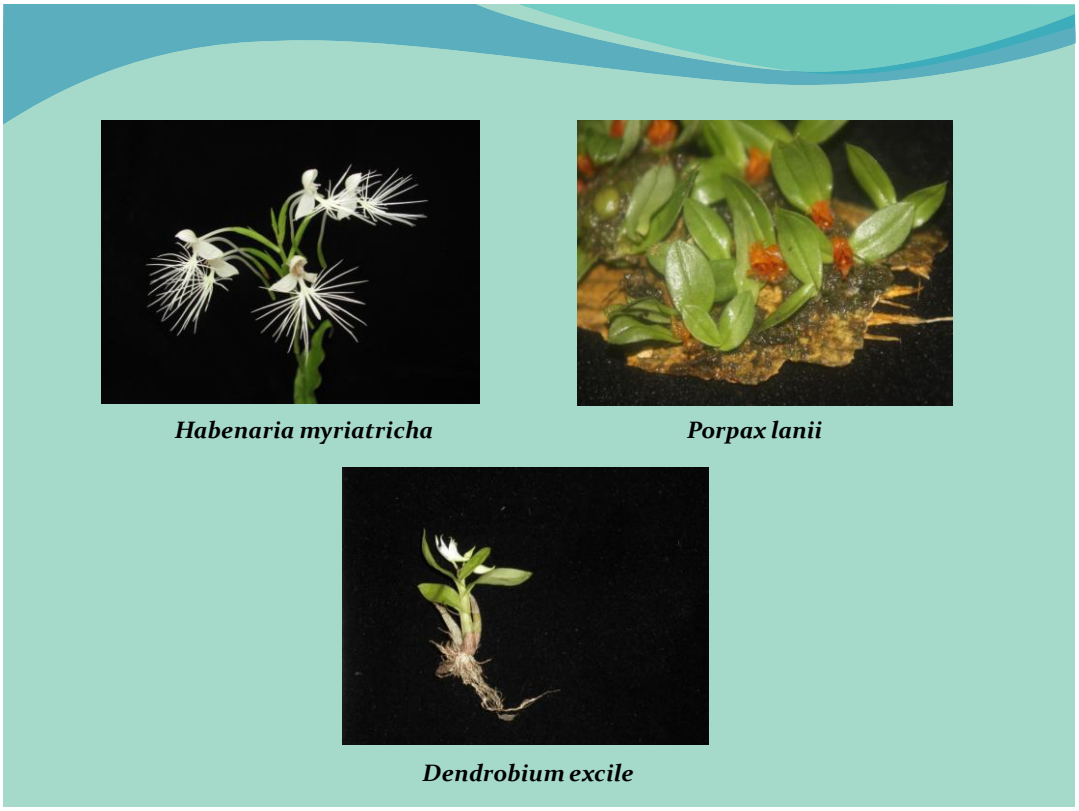
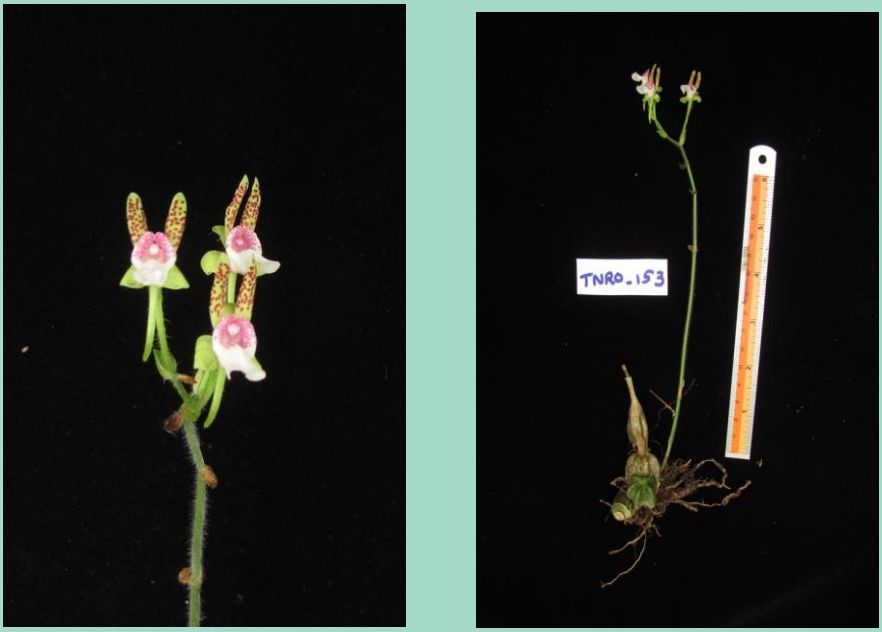


Fig.(3) New Record For Myanmar(Species Level) From TNR Orchid Survey

New Record for Myanmar (Genus Level, to be confirmed)

Stereosandra javanica

New Record for Science(Species Level, have to continue for confirmation)



Calanthe species from Ye' Kan Taung

Fig.(4) New Record For Myanmar(Genus Level) and New Record for Science; *Calanthe*

Fig.(5)Orchid Conservation Talks at Tharyarmon and Mi Chaung Hlaung Old Villages

Fig.(6) Orchid Growing and Conservation Training at EEC, TNRP

CHAPTER 4

RESULT

Four orchid survey trips conducted from March, 2012 to November, 2012.

One hundred and ninety-four orchid collections were performed in four survey trips. The results obtained were satisfactory although the survey was listed compared with the whole TNR area. Confirmed species numbers resulted in (73) species. Fifty genuses were recorded. Another outcome of survey is orchid herbarium sheets (50) nos. and orchid flowers in spirit bottles (57) nos. Orchid herbarium sheets and orchid spirit bottles will be handed over to TNR project.

During first trip, only two terrestrial orchids were recorded out of (102) collected orchid species. Yebone- Sakhangyi camp area contains many different epiphytic orchids and new record for Myanmar (Genus level) was collected in Byatkathan Camp. One of the prominent finding of this survey was *Renanthera coccinea* (vernacular name : Pinlei Thit-hkwa Ni) which is also rare in its natural habitat.

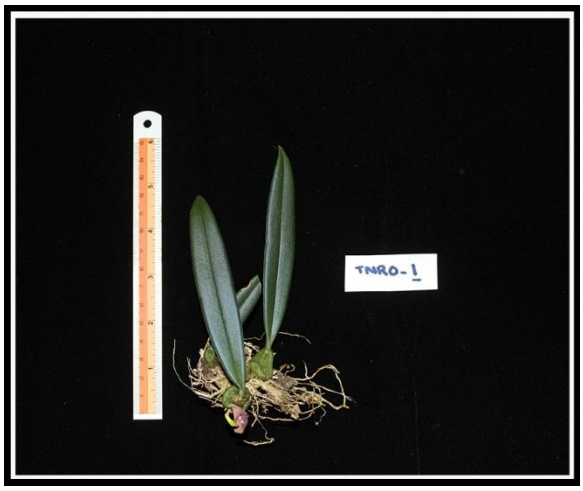
Second survey was conducted in June, 2012. The main disadvantage of this trip was continuous heavy torrential rains and rapid current of streams. Due to rainy season and wet environment, about six terrestrial orchids could be recorded out of 36 collections.

During third trip, two orchid talks were held in Tharyarmon and Mi-Chaung Laung villages. Two days orchid growing and conservation training was conducted for TNR staff, local NGOs, workers from PTTEP, Total and villagers at EEC of Mi-Chaung Laung Old Camp. Twenty orchid collections were collected during third survey trip.

The last and forth trip was conducted three areas. An unusual, beautiful Calanthe species grows on the rock information under the shady area was collected near the Ye Kan Taung area. This Calanthe might be new record for Science and have to continue to get the final confirmation from well-know and Calanthe genus specialist. Altogether (36) orchid collections were done during this final survey trip.

Among (194) orchid collections, (6) orchid species primarily appear as new record for Myanmar. Those orchid are; *Acriopsis carii, A. javanica, Coelogyne flavida, Dendrobium excile, Habenaria myriatricha* and *Porpax lanii*.

TNRO - 1 *Trias picta* (Par. & Rchb.f.) Parish & Hemsley

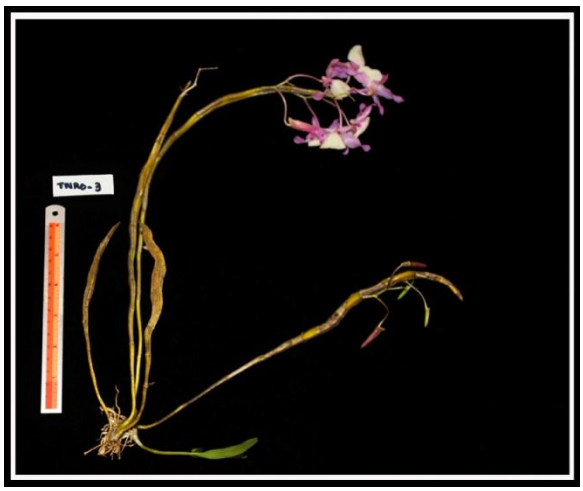


Vernacular Name	:	-
Distribution	:	Nat eain taung
GPS Position	:	N 14˙ 40′ 54.5″ E 098˙ 21′ 45.5″
Altitude	:	3040′
Habit	:	Sympodial epiphytes
Flowering Period	:	August
Stem	:	Pseudobulb ovate
Leaves	:	Thick
Inflorescences	:	Short
Flowers	:	Solitary, 1.7 cm across
Sepals	:	Dirty yellow with many purple dots
Petals	:	Dark purple
Lip	:	Proximal part yellow with red dots
Odour	:	-
Remark	:	Rare

TNRO - 2 *Acriopsis javanica* Reinw.

Vernacular Name	:	-
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˚ 33´ 17.0˝ E 098˚ 11´ 53.5˝
Altitude	:	137´
Habit	:	Sympodial epiphytes
Flowering Period	:	May - January
Stem	:	4 cm long, 2.5 cm wide
Leaves	:	Linear, 20 cm long and 1.5 cm wide
Inflorescences	:	Upright, 25 cm long
Flowers	:	Pale green
Sepals	:	Concave, linear, 4 mm long and 1.5 mm wide
Petals	:	Oblong, 5 mm long and 2 mm wide
Lip	:	Three - lobed
Odour	:	-
Remark	:	Common

TNRO - 3 *Dendrobium tortile* Lindl.



Vernacular Name	:	Thu yaung pan
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31′ 57.8″ E 098˙ 13′ 54.6″
Altitude	:	283′
Habit	:	Sympodial epiphytes
Flowering Period	:	February - April
Stem	:	Many jointed, erect, 15.0 – 20.0 cm long and 0.7 – 1.0 cm wide
Leaves	:	Axillary, short raceme, erect
Inflorescences	:	Alternate and distinchous, linear, 4.0 – 12.0 cm long and 1.3 – 2.5 cm wide
Flowers	:	3.0 – 3.5 cm across, waxy, purplish white with pinkish purple tips
Sepals	:	Oblong lanceolate, 1.5 – 1.8 cm long and 0.5 – 0.6 cm wide, white tinged with purplish rose
Petals	:	Oblong, 1.8 – 2.0 cm long and 0.4 – 0.5 cm wide, pale pinkish purple
Lip	:	Subsaccate, lemon-yellow streaked with purple at the base
Odour	:	Fragrant
Remark	:	Common

TNRO - 5 *Stereosandra javanica* Blume

Vernacular Name	:	-
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32´ 37.4˝ E 098˙ 14´ 54.9˝
Altitude	:	687´
Habit	:	Terrestrial
Flowering Period	:	April
Stem	:	Erect, 40 cm long
Leaves	:	-
Inflorescences	:	15cm long
Flowers	:	0.9 – 1.1 cm long
Sepals	:	2mm wide, white with dark violet tips
Petals	:	2mm wide, white with dark violet tips
Lip	:	Narrow, white with dark violet tip
Odour	:	-
Remark	:	Common

TNRO - 6 *Dendrobium crepidatum* Lindl.

Vernacular Name	:	Ganaing na bay pauk
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32′ 36.9″ E 098˙ 14′ 55.6″
Altitude	:	727′
Habit	:	Sympodial epiphytes
Flowering Period	:	April - May
Stem	:	Erect or slightly drooping
Leaves	:	Bearing several leaves, cauline, coriaceous
Inflorescences	:	2 – 3 per internode
Flowers	:	3.5 – 4.0 cm across
Sepals	:	Purplish white
Petals	:	Purplish white
Lip	:	Yellow center, white tipped 2.0 – 2.5 cm wide
Odour	:	Fragrant
Remark	:	Common

TNRO - 7 *Dendrobium aphyllum* (Rox.b.) C. Fisch

Vernacular Name	:	Let tan shay
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˚ 32′ 36.9″ E 098˚ 14′ 55.6″
Altitude	:	727′
Habit	:	Sympodial epiphytes
Flowering Period	:	March - April
Stem	:	Slender, pendulous, 100 cm long
Leaves	:	4 – 6 cm long and 0.8 – 2 cm wide, all deciduous before flowering, cauline, coriaceous
Inflorescences	:	1 – 3 per node
Flowers	:	4 – 6 cm across
Sepals	:	Mauve white 2.0 cm long and 0.8 – 1.0 cm wide
Petals	:	Light mauve white colour, 1.8 cm long and 0.8 cm wide
Lip	:	Cream or pale yellow, veined with purple at the base, hairy within 2.8 – 2.0 cm wide, puberulent within
Odour	:	-
Remark	:	Common

TNRO - 8 *Dendrobium parcum* Rchb.f.

Vernacular Name	:	Kyee chay
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32′ 36.9″ E 098˙ 14′ 55.6″
Altitude	:	727′
Habit	:	Sympodial epiphytes
Flowering Period	:	March - April
Stem	:	Erect, slender, 30.0 cm – 40.0 cm long and 0.7cm wide, dark brown, branched
Leaves	:	Linear lanceolate, 9.0 cm long and 1.2 cm wide
Inflorescences	:	Raceme, erect
Flowers	:	Small, pale green, 0.3 cm long and 0.2 cm wide, 4 – 6 flowers
Sepals	:	Linear, yellowish green, 0.3cm long and 0.2 cm wide
Petals	:	Narrow, 0.3 cm long and 0.1 cm wide
Lip	:	Oblong, narrow, 0.9 cm long and 0.2 cm wide
Odour	:	-
Remark	:	Common

TNRO - 11 *Dendrobium devonianum* Paxt

Vernacular Name	:	Kyaung khaung pan
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32´ 43.6˝ E 098˙ 15´ 09.7˝
Altitude	:	722´
Habit	:	Sympodial epiphytes
Flowering Period	:	May - July
Stem	:	Slender, pendulous, 30.0 cm to 50.0 cm long and 1.0 cm wide
Leaves	:	Alternate, linear lanceloate, 12.0 cm long and 1.5cm wide
Inflorescences	:	Raceme
Flowers	:	White with rose purple, resupinate, 4.0 cm across, 1-2 flowers
Sepals	:	Lanceolate acute, creamy coloured lightly shaded with pinkish purple with purplish blotch at the tip, 2.0cm long and 0.5cm wide
Petals	:	Oblong ovate, acute, 2.2 cm long and 1.0 cm wide, creamy coloured lightly shaded with pinkish purple with purplish bloth at the tip
Lip	:	Broadly heart-shaped
Odour	:	-
Remark	:	Rare

TNRO - 12 *Dendrobium farmeri* Paxt.

Vernacular Name	:	Ngwe tu galay
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32´ 42.0˝ E 098˙ 14´ 49.3˝
Altitude	:	867´
Habit	:	Sympodial epiphytes
Flowering Period	:	January - February
Stem	:	Pseudobulbs up to 30 cm long, thickened and strongly quadrangular towards the upper part
Leaves	:	3 or 4 leaves, up to 15 cm long, cauline, coriaceous
Inflorescences	:	Drooping up to 20 cm long, lax
Flowers	:	Dense, 2.3 – 2.7 cm across
Sepals	:	Lilac-mauve or white
Petals	:	Lilac-mauve or white
Lip	:	Bright orange-yellow, hairy
Odour	:	-
Remark	:	Rare

TNRO - 13 *Dendrobium lindleyi* Steud.

Vernacular Name	:	Yadana shwe khat
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32′ 44.9″ E 098˙ 14′ 47.5″
Altitude	:	992′
Habit	:	Sympodial epiphytes
Flowering Period	:	March - April
Stem	:	Pseudobulbs fusiform, furrowed, 7.0 – 10.0 cm long and 3.0 cm wide
Leaves	:	Oblong oval, 7.0 cm long and 2.5 cm wide
Inflorescences	:	Long, pendulous
Flowers	:	Deep golden yellow, resupinate, 3.0 cm long and wide, 10 -15
Sepals	:	Ovate obtuse, 1.3 cm long and 0.6 cm wide, yellow
Petals	:	Ovate, 1.5 cm long and 0.9 cm wide, yellow
Lip	:	Oval, concave, 2.2 cm long and wide
Odour	:	-
Remark	:	Rare

TNRO - 17 *Dendrobium chrysotoxum* Lindl.

Vernacular Name	:	Shwe tu
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32´ 05.5˝ E 098˙ 15´ 55.6˝
Altitude	:	691´
Habit	:	Sympodial epiphytes
Flowering Period	:	May - June
Stem	:	Pseudobulbs up to 30 cm long, thickened towards the upper half, many-grooved, yellowish when old
Leaves	:	10 – 15 cm long, cauline, coriaceous
Inflorescences	:	Erect or slightly drooping
Flowers	:	1- 25, 3.5 – 4.0 cm across, bright yellow
Sepals	:	Bright yellow 2 – 3 cm long and 0.8 – 1.0 cm wide
Petals	:	Bright yellow 2.5 – 3.5 cm long and 1.5 – 2.0 cm wide
Lip	:	Deeper shade than the above perianth, edge crisp, finely fringed
Odour	:	-
Remark	:	Rare

TNRO - 18 *Bulbophyllum craibianum* Kerr.

Vernacular Name	:	-
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32′ 05.5″ E 098˙ 15′ 55.6″
Altitude	:	719′
Habit	:	Sympodial epiphytes
Flowering Period	:	September
Stem	:	Pseudobulb slender
Leaves	:	Small
Inflorescences	:	Racemose, lanceolate, acute, concave
Flowers	:	3 flowered, 0.6 cm across
Sepals	:	Light yellow with orange yellow tip
Petals	:	Light yellow with orange yellow tip
Lip	:	Apex of lip minutely retuse
Odour	:	-
Remark	:	Common

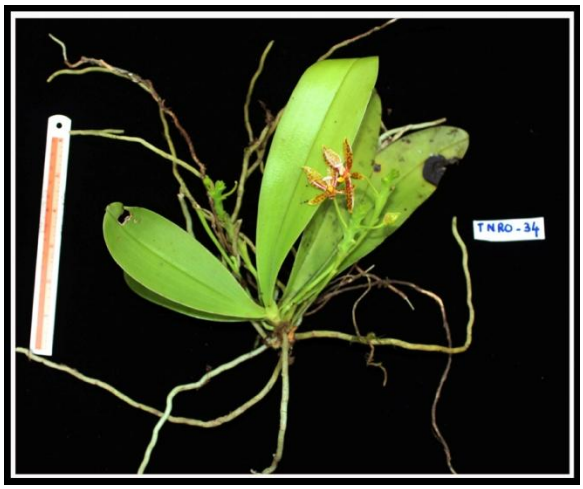
TNRO - 29 *Dendrobium fimbriatum* Lindl.

Vernacular Name	:	Ahrme lettanto
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31′ 28.8″ E 098˙ 17′ 02.0″
Altitude	:	574′
Habit	:	Sympodial epiphytes
Flowering Period	:	May - June
Stem	:	Up to 120 cm more or long, yellowish green when older
Leaves	:	Cauline, coriaceous
Inflorescences	:	Pendulous
Flowers	:	10 – 20 flowered,3.5 cm across
Sepals	:	Light orange to golden colour
Petals	:	Light orange to golden colour
Lip	:	The base dark mauve-blotched fimbriated
Odour	:	-
Remark	:	Common

TNRO - 31 *Cymbidium aloifolium* (L.) Sw.

Vernacular Name	:	Thit tet lin nay
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31´ 28.8˝ E 098˙ 17´ 02.0˝
Altitude	:	574´
Habit	:	Sympodial epiphytes
Flowering Period	:	March - June
Stem	:	Pseudobulbs usually strongly in flattened, enclosed in the persistent leaf bases
Leaves	:	Linear
Inflorescences	:	Pendulous spike, 25 – more than 50 cm long
Flowers	:	15 – 40, 3 - 4 cm wide
Sepals	:	1.9 – 2.4 cm long and 0.5 – 0.8 cm wide, reddish brown
Petals	:	1.8 – 2.3 cm long and 0.5 – 0.8 cm wide, reddish brown bordered by white
Lip	:	1.5 – 2.3 cm long and 1.0 – 1.4 cm wide, red purple striped, pure yellow quite rare
Odour	:	-
Remark	:	Common

TNRO - 34 *Phalaenopsis cornu-cervi* Bl & Rchb.f.



Vernacular Name	:	Leik pyar thitkhwa
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31´ 29.7˝ E 098˙ 17´ 03.3˝
Altitude	:	585´
Habit	:	Sympodial epiphytes
Flowering Period	:	July - August
Stem	:	Elongate, 5 – 10 cm long
Leaves	:	Oblanceolate, pale green
Inflorescences	:	Panicles, 9 cm long
Flowers	:	Strongly two-ranked in plane with the flattened rachis, yellow with reddish brown spots and transverse bars
Sepals	:	Oblong-elliptic, acute, 2.3 cm long and 0.8 cm wide
Petals	:	Oblong, obtuse, 1.8cm long and 0.6 cm wide
Lip	:	Three-lobed, 0.8 cm long and 1 cm wide
Odour	:	-
Remark	:	Rare

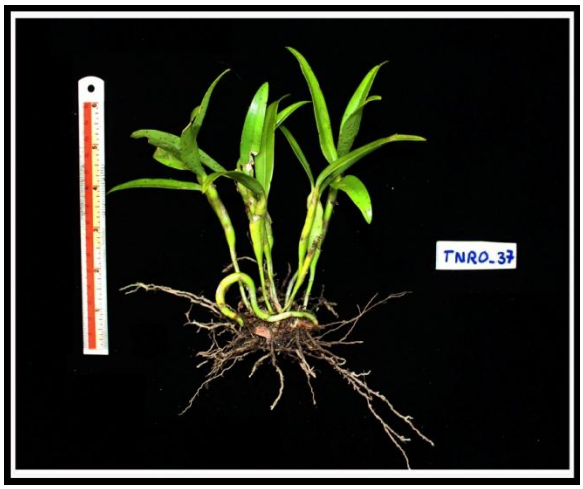
TNRO - 35 *Panisea uniflora* (Lindl.) Lindl.

Vernacular Name	:	-
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31´ 29.7˝ E 098˙ 17´ 03.3˝
Altitude	:	585´
Habit	:	Sympodial epiphytes
Flowering Period	:	August - September
Stem	:	Clustered pseudobulbs about 1.5 cm high, of one internode
Leaves	:	Narrowly elliptic
Inflorescences	:	Solitary
Flowers	:	1.5 – 2.0 cm, light greenish yellow
Sepals	:	Dorsal up to 2mm long, light greenish yellow
Petals	:	Smaller than sepals, light greenish yellow
Lip	:	With three orange sopts, the side lobes distinct, the operculum yellow
Odour	:	-
Remark	:	Common

TNRO - 36 *Pholidota articulata* Lindl

Vernacular Name	:	Kwyet mee pan myo kwe
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31´ 29.7˝ E 098˙ 17´ 03.3˝
Altitude	:	585´
Habit	:	Sympodial epiphytes
Flowering Period	:	May - June
Stem	:	Slender, cylindrical pseudobulbs, often about 10 cm long, each rising from the apex of the last, the whole pseudobulbs
Leaves	:	8 – 10cm long and 3.5 – 4.0 cm wide, elliptic, acute
Inflorescences	:	Peduncle scorpioid
Flowers	:	15cm long and 0.8 – 1.0 cm wide, pinkish to dull white
Sepals	:	White spread, 45 mm long and 35 mm wide
Petals	:	Nearly equal to above, apread up 45 mm long and 25 mm wide
Lip	:	Longitudinal ridges, narrowed at its end bear as a blade, slightly twisted, slightly bilobed, yellow
Odour	:	-
Remark	:	Common

TNRO - 37 *Eria biflora* Griff



Vernacular Name	:	-
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31´ 29.7˝ E 098˙ 17´ 03.3˝
Altitude	:	585´
Habit	:	Sympodial epiphytes
Flowering Period	:	June - July
Stem	:	15 cm long
Leaves	:	9 cm long and 1.8 cm wide
Inflorescences	:	Short
Flowers	:	Hardly opening, pale yellowish
Sepals	:	Pale yellowish
Petals	:	Pale yellowish
Lip	:	Curved, 4mm long
Odour	:	-
Remark	:	Common

TNRO - 38 *Rhynchostylis retusa* (L.) Blume

Vernacular Name	:	Kyaung mee tu
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31´ 29.7˝ E 098˙ 17´ 03.3˝
Altitude	:	585´
Habit	:	Monopodial epiphytes
Flowering Period	:	May - July
Stem	:	Thick, short
Leaves	:	Thick
Inflorescences	:	Drooping, unbranched
Flowers	:	Up to 40 cm long and 1.0 – 1.5 cm wide,many
Sepals	:	White with purple spots
Petals	:	White with purple spots
Lip	:	Purple, purple with white base and tip
Odour	:	-
Remark	:	Common

TNRO - 40 *Pholidota imbricata* Lindl

Vernacular Name	:	Padi sint pan
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31´ 29.7˝ E 098˙ 17´ 03.3˝
Altitude	:	585´
Habit	:	Sympodial epiphytes
Flowering Period	:	August - October
Stem	:	Ovate-oblong
Leaves	:	Elliptic-lanceolate, 21-32 cm long and 4.9 – 5.5 cm wide
Inflorescences	:	Basal, many-flowered, 20-24 cm long and 2.0 – 2.3 cm wide
Flowers	:	3.5 mm long and 2 – 4 mm wide
Sepals	:	Broadly ovate
Petals	:	Elliptic, about 0.7 mm long and 0.3 mm wide
Lip	:	Triangular, about 7 mm long and 5 mm wide
Odour	:	Fragrant
Remark	:	

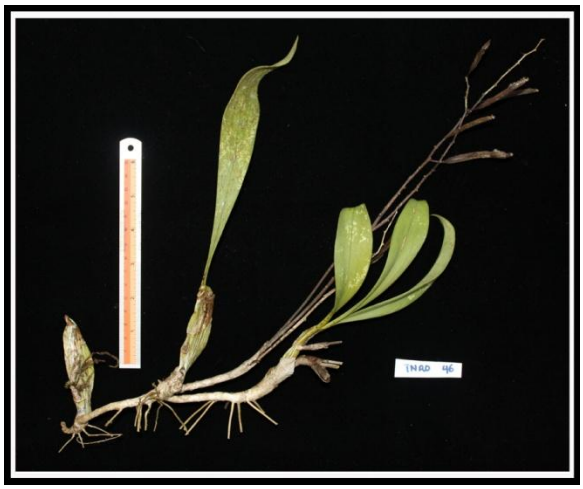
TNRO - 41 *Dendrobium pulchellum* Roxb.ex Lindl.

Vernacular Name	:	Sin ma myet kwine
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31′ 29.7″ E 098˙ 17′ 03.3″
Altitude	:	585′
Habit	:	Sympodial epiphytes
Flowering Period	:	February - March
Stem	:	Large erect 100 – 200 cm long, purplish when old
Leaves	:	The sheaths purple-striped, 10 – 15 cm long, cauline, coriaceous
Inflorescences	:	Pendulous
Flowers	:	5 – 12, 7.0 – 10.0 cm long
Sepals	:	Creamy yellow to rose-yellow spreading
Petals	:	Creamy yellow with pink veins
Lip	:	Pinkish with two large crimson blotches
Odour	:	-
Remark	:	Rare

TNRO - 45 *Dendrobium bilobulatum* Seidenf.

Vernacular Name	:	-
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31´ 29.7˝ E 098˙ 17´ 03.3˝
Altitude	:	585´
Habit	:	Sympodial epiphytes
Flowering Period	:	January
Stem	:	Narrow
Leaves	:	Thick
Inflorescences	:	Short
Flowers	:	Creamy white, 1 cm across, 1 – 3 flowered
Sepals	:	With fine purple lines
Petals	:	With fine purple line
Lip	:	A deep split, center of lip with brownish orange warts
Odour	:	-
Remark	:	Common

TNRO - 46 *Eria tomentosa* (J.Konig) Hook.f.



Vernacular Name	:	-
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″
Altitude	:	585′
Habit	:	Sympodial epiphytes
Flowering Period	:	April
Stem	:	Fleshy pseudobulb, erect
Leaves	:	Duplicate
Inflorescences	:	Racemes terminal or lateral
Flowers	:	Few, glabrous
Sepals	:	Subequal
Petals	:	Subequal
Lip	:	Entire
Odour	:	-
Remark	:	Common

TNRO - 47 *Liparis vestita* Rchb.f.

Vernacular Name	:	-
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31′ 29.7″ E 098˙ 17′ 03.3″
Altitude	:	585′
Habit	:	Sympodial epiphytes
Flowering Period	:	September - January
Stem	:	Pseudobulb clustered, ovoid
Leaves	:	Linear
Inflorescences	:	15 cm long
Flowers	:	Raceme, small yellowish green
Sepals	:	Green
Petals	:	Green
Lip	:	Reflexed
Odour	:	-
Remark	:	Common

TNRO - 57 *Renanthera coccinea* Lour

Vernacular Name	:	Pin lay thitkhwa ni
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 31′ 29.7″ E 098˙ 17′ 03.3″
Altitude	:	585′
Habit	:	Monopodial epiphytes
Flowering Period	:	Apirl
Stem	:	Climbing, terete, 10 - 20 m long
Leaves	:	Oblong, 7 – 8 cm long, 1.5 – 3.3 cm wide
Inflorescences	:	Stout and rigid, 1 m long
Flowers	:	Flame-red
Sepals	:	Narrowly spatulate, obtuse, 2 – 3 cm long, 4.5 – 6 mm wide
Petals	:	Smaller, rounded
Lip	:	Sub-orbicular or quadrate, 3 mm long, 4 mm wide
Odour	:	-
Remark	:	Rare

TNRO - 58 *Didymoplexis pallens* Griff.

Vernacular Name	:	-
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32′ 26.7″ E 098˙ 15′ 08.5″
Altitude	:	712′
Habit	:	Saprophytes
Flowering Period	:	April - May
Stem	:	Erect, 5 – 12 cm long
Leaves	:	Without green leaves
Inflorescences	:	Erect
Flowers	:	Erect, pale brown-dive, 1 – 1.4 cm long, Raceme
Sepals	:	United petals, to each other almost for half its length
Petals	:	United sepals, to each other almost for half its length
Lip	:	Yellowish white
Odour	:	-
Remark	:	Common

TNRO - 59 *Papilionanthe teres* (Roxb.) Schltr.

Vernacular Name	:	Yoeset gyi
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32′ 26.7″ E 098˙ 15′ 08.5″
Altitude	:	712′
Habit	:	Monopodial epiphytes
Flowering Period	:	March - May
Stem	:	50.0 cm high
Leaves	:	Alternate, terete, green with purple spot, 15.0 cm long and 0.4 cm wide
Inflorescences	:	Raceme, arising from the node
Flowers	:	Large, showy, resupinate, 5.0 cm across
Sepals	:	Ovate orbicular, pale purple, 2.0 cm long and 1.7 cm wide
Petals	:	Ovate orbicular, lilac with purple inner portion, 2.2 cm long and 2.0 cm wide
Lip	:	Large, trilobed
Odour	:	-
Remark	:	Common

TNRO - 62 *Bulbophyllum auricomum* (Lindl.)

Vernacular Name	:	Thazin
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32´ 26.7˝ E 098˙ 15´ 08.5˝
Altitude	:	712´
Habit	:	Sympodial epiphytes
Flowering Period	:	November - January
Stem	:	Ovoid-oblong pseudobulb, erect
Leaves	:	Deciduous, thinly fleshy
Inflorescences	:	Long, racemose
Flowers	:	Many flowered, yellowish white
Sepals	:	Oblong, acute
Petals	:	Oval
Lip	:	Oblong, abtuse
Odour	:	Fragrant
Remark	:	Rare

TNRO - 64 *Smitinandia micrantha* Lindl.

Vernacular Name	:	-
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32′ 26.7″ E 098˙ 15′ 08.5″
Altitude	:	712′
Habit	:	Monopodial epiphytes
Flowering Period	:	April - May
Stem	:	Slender, branched, 6.0 cm long and 1.0 cm wide
Leaves	:	Alternating at the opposite of the stem, 8.0 – 9.0 cm long and 1.2 cm wide
Inflorescences	:	Raceme, lateal, many flowered, short, 4.0 cm long and 1.2 cm wide
Flowers	:	Resupinate, light pink flower, 0.6 cm long and wide
Sepals	:	Ovate acute, pale purple, 0.3 cm long and 0.2 cm wide
Petals	:	Linear acute, pale purple, 0.2 cm long and 0.1 cm wide
Lip	:	Trilobed, dark purple
Odour	:	-
Remark	:	Common

TNRO - 65 *Eria ornata* (Blume)

Vernacular Name	:	-
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32′ 26.7″ E 098˙ 15′ 08.5″
Altitude	:	712′
Habit	:	Sympodial epiphytes
Flowering Period	:	September - October
Stem	:	Flattened, 8 cm high, 3 cm wide
Leaves	:	Leathery, 15 cm long, 3 cm wide
Inflorescences	:	Upright, 30 cm long
Flowers	:	Pink to dull brown
Sepals	:	Lanceolate, 1.5 cm long, 4.5 mm wide
Petals	:	Lanceolate, 1.3 cm long, 3 mm wide
Lip	:	Three-lobed, 1.4 cm long, 6 mm wide
Odour	:	-
Remark	:	Common

TNRO - 66 *Dendrobium formosum* Roxb.ex Lindl.

Vernacular Name	:	Ngwe tu
Distribution	:	Ye bone sakhan gyi
GPS Position	:	N 14˙ 32′ 26.7″ E 098˙ 15′ 08.5″
Altitude	:	712′
Habit	:	Sympodial epiphytes
Flowering Period	:	March - May
Stem	:	Pesudobulbs many jointed, erect, 20.0 – 35.0 cm long and 1.0 – 2.0 cm wide
Leaves	:	Alternate and distichous, ovate-oblong 7.0 – 9.0 cm long and 1.5 – 2.0 cm wide
Inflorescences	:	Terminal and axillary racemes, 1-2 on each pseudobulb
Flowers	:	7.0 – 8.0 cm across, white with dark yellow
Sepals	:	Surface glabrous, the margin entire,white
Petals	:	Broadly obovate, 5.0 – 6.0 cm long and 3.0 – 4.0 cm wide, white, surface glabrous
Lip	:	Infundibulliform, 2.0 – 2.5 cm long and 0.6 – 1.0 cm wide, slightly recurved
Odour	:	Fragrant
Remark	:	Common

TNRO - 67 *Eria obesa* Lindl.

Vernacular Name	:	-
Distribution	:	Service track
GPS Position	:	N 14˙ 40′ 47.9″ E 098˙ 18′ 57.3″
Altitude	:	463′
Habit	:	Sympodial epiphytes
Flowering Period	:	August
Stem	:	Pseudobulbs stoutly, clavate-ovate, 4-7 cm long
Leaves	:	1.0 - 1.5 cm long, brown, scarious, lanceolate
Inflorescences	:	Raceme, lateral sub-corymbose
Flowers	:	White, 2 cm across in diameter, glabrous
Sepals	:	Unequal, 1.0 – 12 cm long, lanceolate
Petals	:	Oblong-lanceolate, obtuse, 10-12 mm long and 2 mm wide
Lip	:	Linear
Odour	:	-
Remark	:	Common

TNRO - 72 *Dendrobium primulinum* Lindl.

Vernacular Name	:	Thinn kyu kyu
Distribution	:	Service track
GPS Position	:	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″
Altitude	:	592′
Habit	:	Sympodial epiphytes
Flowering Period	:	February - April
Stem	:	Slender, pendulous to 60 cm long
Leaves	:	Deciduous on flowering, cauline, coriaceous
Inflorescences	:	Solitary per node
Flowers	:	5 – 6 cm
Sepals	:	Light mauve, wider than petals, 5 – 6 mm wide
Petals	:	Light mauve
Lip	:	Pale yellow with purple veins, mouth of the lip 3 cm wide
Odour	:	-
Remark	:	Rare

TNRO - 73 *Thrixspermum trichoglottis* (Hk.f.) Kze.

Vernacular Name	:	-
Distribution	:	Service track
GPS Position	:	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″
Altitude	:	592′
Habit	:	Sympodial epiphytes
Flowering Period	:	October
Stem	:	Short
Leaves	:	Distichous, flattened
Inflorescences	:	Axillary
Flowers	:	White, Solitary, 1.2 cm across, often fully open for only half a day
Sepals	:	White
Petals	:	White
Lip	:	White and hairy with many orange dots
Odour	:	-
Remark	:	Rare

TNRO - 74 *Cleisomeria pilosulum* Seid & Garay

Vernacular Name	:	-
Distribution	:	Service track
GPS Position	:	N 14˚ 39′ 32.0″ E 098˚ 20′ 07.9″
Altitude	:	592′
Habit	:	Monopodial epiphytes
Flowering Period	:	June - August
Stem	:	Erect, short
Leaves	:	Strap – shaped, conduplicate, acute
Inflorescences	:	9 cm long, pendent
Flowers	:	0.5 cm across, many flowered
Sepals	:	Greenish white
Petals	:	Greenish white
Lip	:	Light pink
Odour	:	-
Remark	:	Common

TNRO - 78 *Dendrobium incurvum* Lindl.

Vernacular Name	:	Moe thazin
Distribution	:	Service track
GPS Position	:	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″
Altitude	:	592′
Habit	:	Sympodial epiphytes
Flowering Period	:	November
Stem	:	Short, acute at the apex
Leaves	:	Lanceolate
Inflorescences	:	Axillary
Flowers	:	White
Sepals	:	Narrow, white
Petals	:	Narrow, white
Lip	:	Apically acute
Odour	:	Fragrant
Remark	:	Rare

TNRO - 79 *Aerides falcata* Lindl.

Vernacular Name	:	Sar ka lay phyu
Distribution	:	Service track
GPS Position	:	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″
Altitude	:	592′
Habit	:	Monopodial epiphytes
Flowering Period	:	April - May
Stem	:	Stout, drooping, branched
Leaves	:	Fleshy, curved, tip unequally rounded or slightly bilobed
Inflorescences	:	Pendulous, 30 – 40 cm long, 30
Flowers	:	2.5 cm wide
Sepals	:	Lateral white sepals, 1.0 cm wide
Petals	:	White, blotched with light lavender
Lip	:	Spur like a norn, prominent, spur and the side-lobes well developed
Odour	:	Fragrant
Remark	:	Common

TNRO - 80 *Acampe rigida* (Buck-Ham. Ex J.E.Sm.) Hunt.

Vernacular Name	:	Mee ma laung pan
Distribution	:	Service track
GPS Position	:	N 14˚ 39′ 32.0″ E 098˚ 20′ 07.9″
Altitude	:	592′
Habit	:	Monopodial epiphytes
Flowering Period	:	December - January
Stem	:	Stout, often branched, internodes 2.5 – 3.0 cm
Leaves	:	Thick, stiffly ascending, 20.0 x 3.5 cm wide, tip broad
Inflorescences	:	5 – 7, erect with one or two short side-branched, 15.0 cm long
Flowers	:	1.5 cm in width, clustered, head-like
Sepals	:	Broadly round, brownish yellow with reddish brown stripes, laterals slightly kneeled
Petals	:	Lemon yellow
Lip	:	Very fleshy, side-lobe erect, hairy within, lip white
Odour	:	Fragrant
Remark	:	Common

TNRO - 81 *Dendrobium acerosum* Lindl.

Vernacular Name	:	-
Distribution	:	Service track
GPS Position	:	N 14˙ 39′ 31.7″ E 098˙ 20′ 09.5″
Altitude	:	573′
Habit	:	Sympodial epiphytes
Flowering Period	:	April - May
Stem	:	Flexuous, 25 cm long
Leaves	:	Curved
Inflorescences	:	Short
Flowers	:	Pale greenish yellow, 1.2 cm long and 1 cm wide
Sepals	:	3mm long and wide, with strong purple veins
Petals	:	3 mm long and wide, with strong pruple veins
Lip	:	5.5 mm wide, with orange spot
Odour	:	-
Remark	:	Rare

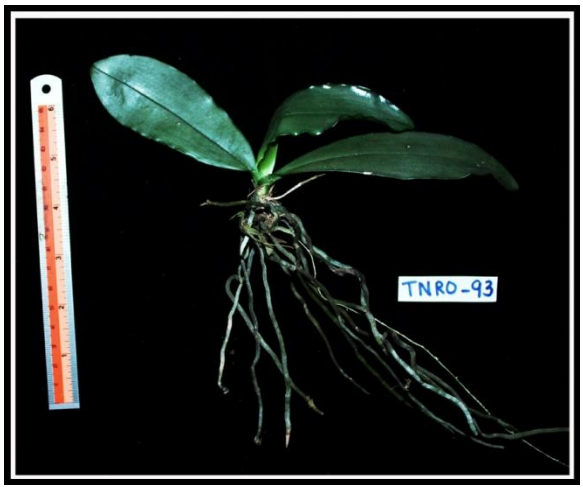
TNRO - 90 *Coelogyne flavida* Wall.ex Lindl.

Vernacular Name	:	Ngwe hnin phyu myo kwe
Distribution	:	Service track
GPS Position	:	N 14˙ 39′ 48.5″ E 098˙ 20′ 38.4″
Altitude	:	924′
Habit	:	Sympodial epiphytes
Flowering Period	:	March - April
Stem	:	Evergreen
Leaves	:	Alternate, oblong elliptic, 12.0 cm long and 1.5 cm wide
Inflorescences	:	Raceme, terminal, 5-7 flowered, pale green, 9.0 cm long and 0.2 cm wide, erect
Flowers	:	Light green, resupinate, 1.5 cm across
Sepals	:	Ovate acute, 0.8 cm long and 0.6 cm wide
Petals	:	Linear,0.8 cm long and 0.2 cm wide
Lip	:	Trilobed, 1.0 cm long and 0.8 cm wide
Odour	:	-
Remark	:	Common

TNRO - 92 *Eria siamensis* Schltr.

Vernacular Name	:	-
Distribution	:	Service track
GPS Position	:	N 14˙ 39′ 48.5″ E 098˙ 20′ 38.4″
Altitude	:	924′
Habit	:	Sympodial epiphytes
Flowering Period	:	July - August
Stem	:	Cylindrical up to 15 cm long with large sheath near base
Leaves	:	Two at apex
Inflorescences	:	Subterminal, dense, erect
Flowers	:	Many
Sepals	:	White, purberulent below
Petals	:	White, about 2.0 x 0.8 mm wide
Lip	:	Purple recurved, ovate
Odour	:	-
Remark	:	Common

TNRO - 93 *Kingidium deliciosum* (Reichb.f.) Sweet



Vernacular Name	:	-
Distribution	:	Service track
GPS Position	:	N 14˙ 39′ 48.5″ E 098˙ 20′ 38.4″
Altitude	:	924′
Habit	:	Sympodial epiphytes
Flowering Period	:	May - June
Stem	:	1 – 1.5 cm long
Leaves	:	Thin, 13 cm long and 3.5 cm wide
Inflorescences	:	Often pendulous
Flowers	:	Small, 1.5 cm across
Sepals	:	White / Pale pinkish purple with darker tiny dots at base
Petals	:	White / Pale pinkish purple with darker tiny dots at base
Lip	:	White with pinkish purple lines on sidelobes
Odour	:	-
Remark	:	Rare

TNRO - 94 *Ascocentrum curvifolium* Lindl.

Vernacular Name	:	-
Distribution	:	Service track
GPS Position	:	N 14˚ 41′ 58.2″ E 098˚ 08′ 06.3″
Altitude	:	75′
Habit	:	Sympodial epiphytes
Flowering Period	:	April - May
Stem	:	Woody
Leaves	:	Strongly decurved
Inflorescences	:	Axillary
Flowers	:	Many flowered
Sepals	:	Red
Petals	:	Red
Lip	:	Red
Odour	:	-
Remark	:	Rare

TNRO - 98 *Dendrobium pachyphyllum* (Kuntze.) Bakh.f.

Vernacular Name	:	-
Distribution	:	Kalainaung pagoda area
GPS Position	:	N 14˙ 41´ 57.8″ E 098˙ 08´ 05.6″
Altitude	:	507´
Habit	:	Sympodial epiphytes
Flowering Period	:	August - September
Stem	:	Pseudobulb small
Leaves	:	Fleshy, 15 mm long and 6 – 7 mm wide
Inflorescences	:	One flowered
Flowers	:	White with purple veins, 1.2 cm across
Sepals	:	White with purple lines
Petals	:	White with purple lines
Lip	:	White with central greenish yellow
Odour	:	-
Remark	:	Rare

TNRO - 101 *Coeloogyne schilleriana* Rchb.f.

Vernacular Name	:	-
Distribution	:	Kalainaung pagoda area
GPS Position	:	N 14˙ 41´ 57.8″ E 098˙ 08´ 05.6″
Altitude	:	507´
Habit	:	Sympodial epiphytes
Flowering Period	:	April - May
Stem	:	Pseudobulbs globose-ovoid
Leaves	:	Elliptic-lanceolate
Inflorescences	:	Terminal, solitary
Flowers	:	6.2 – 7.5 cm long and 4.0 – 4.5 cm wide, pale green
Sepals	:	Oblong-lanceolate, 3.9 – 4.3 cm long and 12 – 14 mm wide
Petals	:	Linear-oblong, 3.0 3.5 cm long and 0.5 – 0.8 cm wide
Lip	:	Obovate, 2.5 cm long and 1.5 cm wide
Odour	:	-
Remark	:	Common

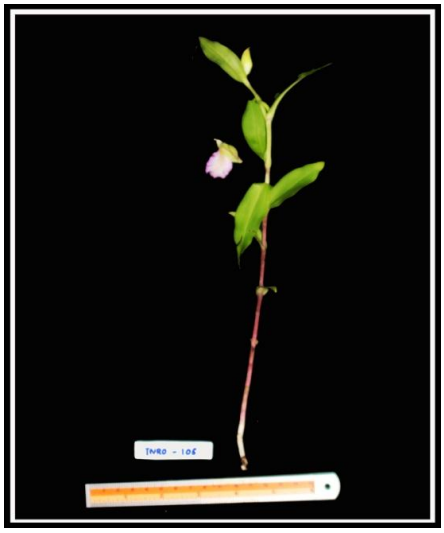
TNRO - 102 *Acriopsis carrii* Holttum

Vernacular Name	:	-
Distribution	:	Kalainaung pagoda area
GPS Position	:	N 14˙ 41´ 57.8″ E 098˙ 08´ 05.6″
Altitude	:	507´
Habit	:	Sympodial epiphytes
Flowering Period	:	February
Stem	:	Pseudobulb short, crowded, ovoid
Leaves	:	Thin
Inflorescences	:	40 cm long, short lateral branches
Flowers	:	Without purple spots, pale yellowish flower
Sepals	:	Pale yellowish
Petals	:	Pale yellowish
Lip	:	White
Odour	:	-
Remark	:	Rare

TNRO - 103 *Dainia latifolia* Sm.

Vernacular Name	:	Myay thitkwa
Distribution	:	Hein ze sakhan
GPS Position	:	N 14˚ 28′ 56.5″ E 098˚ 11′ 29.1″
Altitude	:	228′
Habit	:	Terrestrial
Flowering Period	:	June - July
Stem	:	Pseudobulbs slender, stout
Leaves	:	Elliptic-lanceolate
Inflorescences	:	Erect
Flowers	:	4 mm long and 3 mm wide
Sepals	:	Linear-lanceolate, 3 mm long and 2 mm wide
Petals	:	Linear-lanceolate, 3.5 mm long and 2.0 mm wide
Lip	:	4.0 mm long and wide, yellowish green
Odour	:	Fragrant
Remark	:	-

TNRO - 105 *Brachycorythis helferi* (Rchb.f)



Vernacular Name : -

Distribution : Hein ze sakhan

GPS Position : N 14˚ 28´ 39.6˝
E 098˚ 21´ 19.1˝

Altitude : 220´

Habit : Terrestrial

Flowering Period : June - July

Stem : Erect, dark purple to white

Leaves : Alternate, ovate lanceolate

Inflorescences : Solitary, pale violet to white

Flowers : Solitary, axillary, pale violet to white, 1.0 cm long and 0.4 cm wide

Sepals : Oblong acute concave, pale violet to white, 1.0 cm long and 0.4 cm wide

Petal : Linear acute, erect, pale violet to white, 1.0 cm long and 0.3 cm wide

Lip : Broadly orbicular, deeply purple to white, 1.8 cm long and wide

Odour : -Remark : Common

TNRO - 107 *Tropidia curculigoides* Lindl.

Vernacular Name	:	-
Distribution	:	Hein ze sakhan
GPS Position	:	N 14˙ 27′ 49.7″ E 098˙ 13′ 23.5″
Altitude	:	178′
Habit	:	Terrestrial
Flowering Period	:	January
Stem	:	Elongate, terete
Leaves	:	Elliptic-lanceolate
Inflorescences	:	Terminal and axillary, many flowered
Flowers	:	6 – 10 mm long and 6 – 15 mm wide
Sepals	:	Ovate-lanceolate, 5mm long and 3 mm wide, white
Petals	:	Ovate-oblong, 3mm long and 3mm wide, white
Lip	:	Obscure
Odour	:	Fragrant
Remark	:	Common

TNRO - 110 *Apostasia wallichii* R.B.R

Vernacular Name	:	-
Distribution	:	Hein ze sakhan
GPS Position	:	N 14˙ 27′ 49.0″ E 098˙ 13′ 22.7″
Altitude	:	213′
Habit	:	Terrestrial
Flowering Period	:	June
Stem	:	20 – 30 cm tall
Leaves	:	Many
Inflorescences	:	Branched
Flowers	:	Yellow
Sepals	:	5.5 mm long, yellow
Petals	:	5.5 mm long, yellow
Lip	:	Yellow
Odour	:	-
Remark	:	Rare

TNRO - 115 *Porpax lanii* Seidenf.

Vernacular Name	:	Nga let ma
Distribution	:	Hein ze sakhan
GPS Position	:	N 14˙ 28´ 16.5˝ E 098˙ 13´ 51.5˝
Altitude	:	193´
Habit	:	Sympodial epiphytes
Flowering Period	:	May - June
Stem	:	Lens like pseudobulb
Leaves	:	Thick
Inflorescences	:	Short
Flowers	:	2 flowered, Orange brown flower
Sepals	:	Short white hair scattered outside
Petals	:	Short white hair scattered outside
Lip	:	Very small
Odour	:	Common
Remark	:	Rare

TNRO - 116 *Peristylus goodyeroides* Lindl.

Vernacular Name	:	-
Distribution	:	Ma yan chaung ywar
GPS Position	:	N 14˙ 45′ 35.8″ E 098˙ 06′ 03.0″
Altitude	:	425′
Habit	:	Terrestrial
Flowering Period	:	June
Stem	:	10-40 cm tall
Leaves	:	Elliptic, acute
Inflorescences	:	Fusiform, 8 – 10 cm long
Flowers	:	Creamy white, 20 – 80 or more
Sepals	:	Ovate, obtuse, 4 – 4.5 mm long, 3 – 3.5 mm wide
Petals	:	Obliquely ovate, obtuse, 4 mm long and wide
Lip	:	Ovate, 2 mm long, 1.7 mm wide
Odour	:	-
Remark	:	Common

TNRO - 126 *Dendrobium moschatum* (Buch. Ham.) Sw.

Vernacular Name	:	War so pan
Distribution	:	Kin chaung
GPS Position	:	N 14˙ 50′ 57.5″ E 098˙ 04′ 00.4″
Altitude	:	139′
Habit	:	Sympoidial epiphytes
Flowering Period	:	April - May
Stem	:	More than 1.5 cm long, erect dark brownish when old
Leaves	:	Cauline, coriaceous, persistent leaves on stem
Inflorescences	:	Pendulous up to 20 cm long
Flowers	:	8 – 10, 6 – 9 cm across
Sepals	:	Pale yellow with purplish veins
Petals	:	Yellow to light orange petals, curved
Lip	:	Cupular, hairy with two large maroon patches
Odour	:	-
Remark	:	Rare

TNRO - 127 *Micropera obtusa* Lindl

Vernacular Name	:	-
Distribution	:	Zin bar ywar
GPS Position	:	N 14˙ 37′ 46.5″ E 098˙ 10′ 22.2″
Altitude	:	67′
Habit	:	Monopodial epiphytes
Flowering Period	:	March – April
Stem	:	Erect
Leaves	:	Linear-oblong
Inflorescences	:	Raceme, 6 – 15 cm long
Flowers	:	10 – 15 flowered
Sepals	:	Pinkish white
Petals	:	Pinkish white
Lip	:	Sac yellow
Odour	:	-
Remark	:	Common

TNRO - 131 *Agrostophyllum planicaule* (Wall. ex Lindl.) Rchb.f

Vernacular Name	:	Myet thitkhwa
Distribution	:	Zin bar ywar
GPS Position	:	N 14˙ 37′ 46.5″ E 098˙ 10′ 22.2″
Altitude	:	67′
Habit	:	Sympodial epiphytes
Flowering Period	:	July - August
Stem	:	Flattened, erect, whitish green
Leaves	:	Distichous, linear-lanceolate, green
Inflorescences	:	Sessile terminal head, crowded, erect, 18 – 20 flowered
Flowers	:	0.5 cm across, creamy white
Sepals	:	Concave, 0.5 – 0.7 cm long and 0.3 – 0.4 cm wide, creamy white
Petals	:	Narrow, 0.5 – 0.6 cm long and 0.2 – 0.3 cm wide, creamy white
Lip	:	Orbicular
Odour	:	Fragrant
Remark	:	Common

TNRO -133 *Eria globulifera* Seidenf.

Vernacular Name	:	-
Distribution	:	Zin bar ywar
GPS Position	:	N 14˙ 37′ 46.5″ E 098˙ 10′ 22.2″
Altitude	:	67′
Habit	:	Sympodial epiphytes
Flowering Period	:	November
Stem	:	Fleshy pseudobulb, ovoid
Leaves	:	Narrow
Inflorescences	:	2 – 3 cm long
Flowers	:	Cream-colored, 0.5 cm across
Sepals	:	Cream-colored
Petals	:	Cream-colored
Lip	:	Yellow, Thick
Odour	:	-
Remark	:	Common

TNRO - 145 *Coelogyne trinervis* Lindl.

Vernacular Name	:	-
Distribution	:	Yae kan taung
GPS Position	:	N 14˙ 35´ 18.8˝ E 098˙ 02´ 16.9˝
Altitude	:	646´
Habit	:	Sympodial epiphytes
Flowering Period	:	May - June
Stem	:	One-jointed, fleshy, erect
Leaves	:	Elliptic-lanceolate
Inflorescences	:	Axillary raceme, erect
Flowers	:	Light greenish yellow, 2.5 – 3.0 cm across, 10 – 13 flowered
Sepals	:	Oblong lanceolate, 1.0 – 1.2 cm long and 0.5 – 0.7 cm wide, light greenish yellow
Petals	:	Linear lanceolate, 5.0 – 6.0 cm long and 0.5 mm wide, light greenish yellow
Lip	:	Sessile on the base of the column
Odour	:	Fragrant
Remark	:	Common

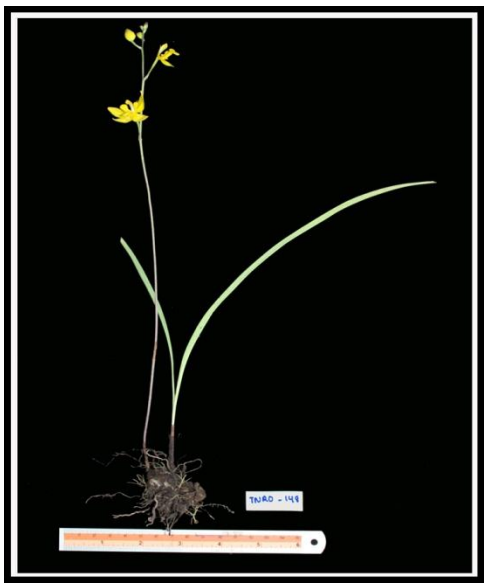
TNRO - 146 *Dendrobium indivisum* (Bl.)

Vernacular Name	:	-
Distribution	:	Yae kan taung
GPS Position	:	N 14˙ 35′ 09.3″ E 098˙ 02′ 17.7″
Altitude	:	916′
Habit	:	Sympodial epiphytes
Flowering Period	:	May - July
Stem	:	Stiff, compressed, glabrous
Leaves	:	Alternate and distichous, coriaceous,deciduous
Inflorescences	:	Lateral or axillary raceme
Flowers	:	7.5 – 9.0 mm across, yellowish green
Sepals	:	3.3 – 9.0 mm long and 1.0 – 2.0 wide, light greenish yellow
Petals	:	5.0 – 7.0 mm long and 1.0 – 2.0 mm wide, light greenish yellow
Lip	:	Oval-orbicular, 10.0 mm long and 7.0 mm wide
Odour	:	Fragrant
Remark	:	Common

TNRO - 147 *Tainia angustifolia* (Lindl.) Benth. & Hook.f.

Vernacular Name	:	-
Distribution	:	Yae kan taung
GPS Position	:	N 14˚ 35′ 02.1″ E 098˚ 02′ 17.6″
Altitude	:	988′
Habit	:	Terrestrial
Flowering Period	:	September - October
Stem	:	Ovoid pseudobulb
Leaves	:	One, terminal
Inflorescences	:	Raceme, 45 cm long, many flowered
Flowers	:	Pendulous, not widely opened
Sepals	:	1.5 – 1.7 cm long
Petals	:	1.5 – 1.7 cm long
Lip	:	Oblong, 1.5 – 1.7 cm long
Odour	:	-
Remark	:	Common

TNRO - 148 *Sapthoglottis affinis* de Vriese

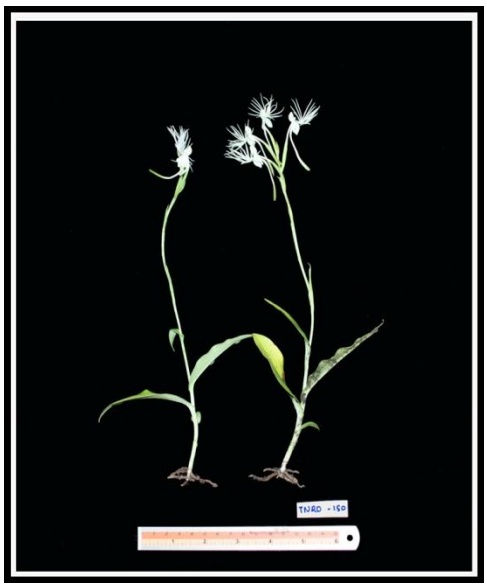


Vernacular Name	:	Ohm thitkhwa ahwar
Distribution	:	Yae kan taung
GPS Position	:	N 14˙ 34′ 56.8″ E 098˙ 02′ 20.3″
Altitude	:	1161′
Habit	:	Terrestrial
Flowering Period	:	May - September
Stem	:	Clustered, ovoid, depressed
Leaves	:	Lanceolate, plicate
Inflorescences	:	Erect, basal
Flowers	:	Cobalt yellow flowers, 3 cm across, 2 – 5 flowered
Sepals	:	Yellow
Petals	:	Yellow
Lip	:	Yellow
Odour	:	-
Remark	:	Common

TNRO - 149 *Dendrobium pachyglossum* Por. & Rchb.f.

Vernacular Name	:	-
Distribution	:	Yae kan taung
GPS Position	:	N 14˙ 34′ 43.2″ E 098˙ 02′ 24.3″
Altitude	:	1356′
Habit	:	Sympodial epiphytes
Flowering Period	:	September
Stem	:	Cylindrical
Leaves	:	Oblong-lanceolate
Inflorescences	:	Terminal, 2 – 4 flowered
Flowers	:	About 1.5 cm long and 2.5 cm wide
Sepals	:	Triangular-ovate, about 5 mm long and 2 mm wide
Petals	:	Linear-lanceolate, about 6 mm long and 3 mm wide
Lip	:	Abovate, about 4 mm long and 6 mm wide
Odour	:	Fragrant
Remark	:	Common

TNRO - 150 *Habeneria myriotricha* Gagnep.



Vernacular Name	:	-
Distribution	:	Yae kan taung
GPS Position	:	N 14˙ 33′ 52.1″ E 098˙ 02′ 36.6″
Altitude	:	2104′
Habit	:	Terrestrial
Flowering Period	:	June - September
Stem	:	19 – 40 cm tall
Leaves	:	Lanceolate
Inflorescences	:	Lax, few-flowered, 3 – 4.4 cm long
Flowers	:	White
Sepals	:	Acute, ovate, 8 – 8.5 mm long and 4 – 4.2 mm wide
Petals	:	Linear, acute or obtuse, 7 – 8 mm long and 0.5 – 11 mm wide
Lip	:	18 – 25 mm long
Odour	:	-
Remark	:	Common

TNRO - 156 *Dendrobium scabrilingue* Lindl.

Vernacular Name	:	Ga mon ein
Distribution	:	Yae kan taung
GPS Position	:	N 14˙ 33´ 04.1˝ E 098˙ 02´ 48.2˝
Altitude	:	2233´
Habit	:	Sympodial epiphytes
Flowering Period	:	December - February
Stem	:	Erect subclavate hirsute
Leaves	:	Linear-oblong broadly 2-lobed
Inflorescences	:	Short
Flowers	:	White
Sepals	:	Ovate-lanceolate subacute
Petals	:	Oblong
Lip	:	Narrow
Odour	:	Fragrant
Remark	:	Common

TNRO - 158 *Arundina graminifolia* (D.Don.) Hochr.

Vernacular Name	:	Wah thikhwa
Distribution	:	Yae kan taung
GPS Position	:	N 14˚ 33′ 10.9″ E 098˚ 02′ 59.9″
Altitude	:	2166′
Habit	:	Sympodial terrestrial
Flowering Period	:	September - November
Stem	:	Grown in open places together among long grasses, thin, 2 – 8 ft high
Leaves	:	Tapering leaves, widely-spaced
Inflorescences	:	Erect, lax, more than 2 floweres per spikes
Flowers	:	6.0 – 7.0 cm in width
Sepals	:	5.0 x 2.8 cm white to light lavender
Petals	:	4.5 x 4.8 x 2.0 – 2.6 cm white to light lavender
Lip	:	Yellow centre and dark purple apex with light purple stripes
Odour	:	-
Remark	:	Common

TNRO - 159 *Bulbophyllum blepharistes* Rechb.f.

Vernacular Name	:	-
Distribution	:	Yae kan taung
GPS Position	:	N 14˙ 35′ 14.6″ E 098˙ 02′ 16.8″
Altitude	:	709′
Habit	:	Sympodial epiphytes
Flowering Period	:	June - November
Stem	:	Angled pseudobulb
Leaves	:	Leathery leaves
Inflorescences	:	Slender, 20 – 30 cm long
Flowers	:	At the apex, 1 cm wide and 3 cm long
Sepals	:	Greenish yellow
Petals	:	Greenish yellow
Lip	:	Without spur
Odour	:	-
Remark	:	Common

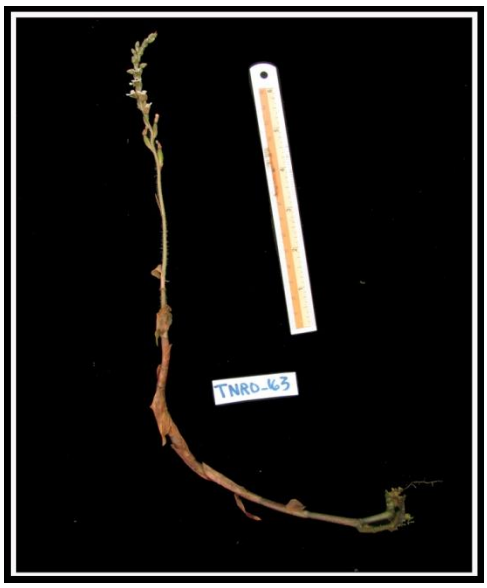
TNRO - 160 *Bulbophyllum crassipes* Hk.f.

Vernacular Name	:	-
Distribution	:	Yae kan taung
GPS Position	:	N 14˙ 35′ 03.9″ E 098˙ 02′ 18.1″
Altitude	:	1010′
Habit	:	Sympodial epiphytes
Flowering Period	:	October - December
Stem	:	Terete, slender, brownish green
Leaves	:	Ovate-lanceolate, tips acuminate, coriaceous, green above and pale green beneath, glabrous
Inflorescences	:	Basal raceme, erect, 7.0 – 8.0 cm long and 1.5 – 2.0 cm wide, 5 flowered
Flowers	:	1.0 – 1.2 cm long and 5.5 – 6.0 mm wide at anthesis, yellow streak with reddish brown
Sepals	:	Reddish brown spots with yellow, 6.0 – 6.5 mm long and 3.0 – 3.5 mm wide, margins entire
Petals	:	Minute broadly ovate, 2.5 – 3.0 mm long and wide
Lip	:	Reddish brown, 4.0 – 4.2 mm long and 2.0 – 2.5 mm wide
Odour	:	-
Remark	:	Common

TNRO - 161 *Eria xanthocheila* Ridley

Vernacular Name	:	-
Distribution	:	Yae kan taung
GPS Position	:	N 14˙ 34′ 51.1″ E 098˙ 02′ 22.8″
Altitude	:	1310′
Habit	:	Sympodial epiphytes
Flowering Period	:	February
Stem	:	30 cm long
Leaves	:	Linear lanceolate
Inflorescences	:	Arching
Flowers	:	Yellowish
Sepals	:	Ovate
Petals	:	Ovate
Lip	:	Distinctly three lobed, circular
Odour	:	-
Remark	:	Common

TNRO - 163 *Zeuzine affinis* Lindl.

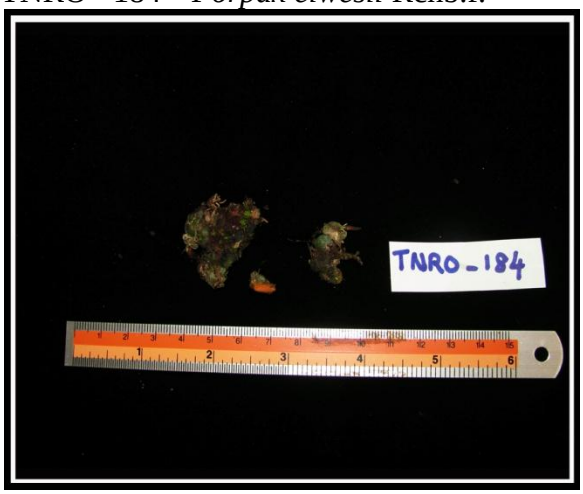


Vernacular Name	:	-
Distribution	:	Yae kan taung
GPS Position	:	N 14˙ 33′ 12.9″ E 098˙ 02′ 51.0″
Altitude	:	2298′
Habit	:	Terrestrial
Flowering Period	:	May
Stem	:	10 – 15 cm high
Leaves	:	Ovate – lanceolate, green
Inflorescences	:	Many flowered
Flowers	:	Pale green
Sepals	:	Obtuse
Petals	:	Elliptic
Lip	:	Yellowish
Odour	:	-
Remark	:	Rare

TNRO - 181 *Trias nasuta* Rchb.f.

Vernacular Name	:	-
Distribution	:	I wyne chaung
GPS Position	:	N 14˙ 20′ 25.0″ E 098˙ 14′ 37.4″
Altitude	:	236′
Habit	:	Sympodial epiphytes
Flowering Period	:	October - November
Stem	:	Crowered pseudobulb
Leaves	:	Linear, thick
Inflorescences	:	Solitary
Flowers	:	Solitary, 2 cm across
Sepals	:	Greenish yellow
Petals	:	Very small with purple tip
Lip	:	Purple at proximal half, bright yellow towards tips
Odour	:	-
Remark	:	Common

TNRO - 184 *Porpax elwesii* Rchb.f.



Vernacular Name	:	-
Distribution	:	Kyauk phyu chaung
GPS Position	:	N 14˙ 20´ 35.6˝ E 098˙ 14´ 35.6˝
Altitude	:	244´
Habit	:	Sympodial epiphytes
Flowering Period	:	October - November
Stem	:	Pseudobulb globose - turbinate
Leaves	:	Elliptic – oblong, many veined
Inflorescences	:	Short, ovate - lanceolate
Flowers	:	Dull red - brown
Sepals	:	United into a tube, free at the apex
Petals	:	Oblong – lanceolate, falcate
Lip	:	3 - lobed
Odour	:	-
Remark	:	Common

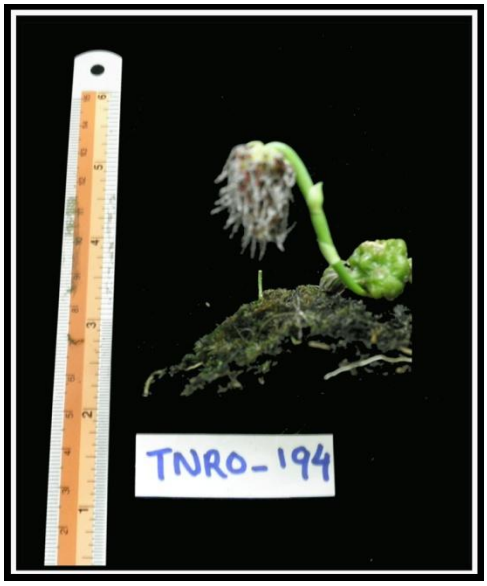
TNRO - 189 *Calanthe vestita* Lindl.

Vernacular Name	:	Thazin gyi
Distribution	:	I wyne chaung
GPS Position	:	N 14˙ 21′ 10.6″ E 098˙ 14′ 21.5″
Altitude	:	540′
Habit	:	Sympodial epiphytes
Flowering Period	:	October
Stem	:	Pseudobulb ovoid, angled, silvery
Leaves	:	Leaf blade 45cm long & 12 cm wide
Inflorescences	:	Pendulous
Flowers	:	12 flowered, white with a yellow callus
Sepals	:	White
Petals	:	White
Lip	:	Tri lobed white lip with yellow marking in the throat
Odour	:	-
Remark	:	Rare

TNRO - 191 *Thrixspermum centipeda* Lour.

Vernacular Name	:	-
Distribution	:	I wyne chaung
GPS Position	:	N 14˙ 20′ 48.6″ E 098˙ 14′ 14.4″
Altitude	:	342′
Habit	:	Monopodial epiphytes
Flowering Period	:	June - September
Stem	:	Short
Leaves	:	Flashy
Inflorescences	:	Erect
Flowers	:	1 – 4 flowered, pale green yellowish
Sepals	:	Long, narrow, pale yellow
Petals	:	Pale yellow
Lip	:	Lighter with a band of orangered dots
Odour	:	-
Remark	:	Rare

TNRO - 194 *Bulbophyllum tripaleum* Seidenf.



Vernacular Name	:	-
Distribution	:	I wyne chaung
GPS Position	:	N 14˙ 19′ 53.9″ E 098˙ 14′ 51.7″
Altitude	:	199′
Habit	:	Sympodial epiphytes
Flowering Period	:	January - February
Stem	:	Pseudobulb dark green
Leaves	:	Acute, broadly lanceolate, deciduous erect
Inflorescences	:	Light green
Flowers	:	Light green, palea transversely banded red
Sepals	:	Light green
Petals	:	Light green
Lip	:	Small, narrow
Odour	:	-
Remark	:	Common

Fig.(7) List of Orchid Genera in TNR Orchid Survey

1.*Acampe*

2.*Acriopsis*

3.*Aerides*

4.*Agrostophyllum*

5.*Apostasia*

6.*Arundina*

7.*Ascocentrum*

8.*Brachycorythis*

9.*Bulbophyllum*

10.*Calanthe*

11.*Ceratostylis*

12.*Cirrhopetalum*

13.*Cleisomeria*

14.*Cleisostoma*

15.*Coelogyne*

16.*Cymbidium*

17.*Dainia*

18.*Dendrobium*

19.*Didymoplexis*

20.*Epigeneium*

21.*Eria*

22.*Eulophia*

23.*Flickingeria*

24.*Gastrochilus*

25.*Geodorum*

26.*Habenaria*

27.*Kingidium*

28.*Liparis*

29.*Luisia*

30.*Malaxis*

31.*Micropera*

32.*Oberonia*

33.*Panisea*

34.*Papilionanthe*

35.*Peristylus*

36.*Phalaenopsis*

37.*Pholiodota*

38.*Porpax*

39.*Renanthera*

40.*Rhynochostylis*

41.*Simitinandia*

42.*Spathoglottis*

43.*Stereosandra*

44.*Tainia*

45.*Thrixspermum*

46.*Trias*

47.*Trichoglottis*

48.*Trichotosia*

49.*Tropidia*

50.*Zeuzine*

(Total – 50 Orchid Genera)

Fig. (8) List of Orchid Species Collected in TN R Orchid Survey

1. TNRO - 1 *Trias picta*
2. TNRO - 2 *Acriopsis javanica*
3. TNRO - 3 *Dendrobium tortile*
4. TNRO - 5 *Stereosandra javanica*
5. TNRO - 6 *Dendrobium crepidatum*
6. TNRO - 7 *Dendrobium aphyllum*
7. TNRO - 8 *Dendrobium parcum*
8. TNRO - 11 *Dendrobium devonianum*
9. TNRO - 12 *Dendrobium farmeri*
10. TNRO - 13 *Dendrobium lindleyi*
11. TNRO - 17 *Dendrobium chrysotoxum*
12. TNRO - 18 *Bulbophyllum craibianum*
13. TNRO - 29 *Dendrobium fimbriatum*
14. TNRO - 31 *Cymbidium aloifolium*
15. TNRO - 34 *Phalaenopsis cornu-cervi*
16. TNRO - 35 *Panisea uniflora*
17. TNRO - 36 *Pholidota articulata*
18. TNRO - 37 *Eria biflora*
19. TNRO - 38 *Rhynchostylis retusa*
20. TNRO - 40 *Pholidota imbricata*
21. TNRO - 41 *Dendrobium pulchellum*
22. TNRO - 45 *Dendrobium bilobulatum*
23. TNRO - 46 *Eria tomentosa*
24. TNRO - 47 *Liparis vestita*
25. TNRO - 57 *Renanthera coccinea*
26. TNRO - 58 *Didymoplexis pallens*
27. TNRO - 59 *Papilionanthe teres*
28. TNRO - 62 *Bulbophyllum auricomum*
29. TNRO - 64 *Smitinandia micrantha*
30. TNRO - 65 Eria ornata
31. TNRO - 66 *Dendrobium formosum*
32. TNRO - 67 *Eria obesa*
33. TNRO - 72 *Dendrobium primulinum*
34. TNRO - 73 *Thrixspermum trichoglottis*
35. TNRO - 74 *Cleisomeria pilosulum*
36. TNRO - 78 *Dendrobium incurvum*
37. TNRO - 79 *Aerides falcata*
38. TNRO - 80 *Acampe rigida*
39. TNRO - 81 *Dendrobium acerosum*
40. TNRO - 90 *Coelogyne flavida*
41. TNRO - 92 *Eria siamensis*
42. TNRO - 93 *Kingidium deliciosum*
43. TNRO - 94 *Ascocentrum curvifolium*
44. TNRO - 98 *Dendrobium pachyphyllum*

45. TNRO - 101 *Coelogyne schilleriana*
46. TNRO - 102 *Acriopsis carrii*
47. TNRO - 103 *Dainia latifolia*
48. TNRO - 105 *Brachycorythis helferi*
49. TNRO - 107 *Tropidia curculigoides*
50. TNRO - 110 *Apostasia wallichii*
51. TNRO - 115 *Porpax lanii*
52. TNRO - 116 *Peristylus goodyeroides*
53. TNRO - 126 *Dendrobium moschatum*
54. TNRO - 127 *Micropera obtusa*
55. TNRO - 131 *Agrostophyllum planicaule*
56. TNRO - 133 *Eria globulifera*
57. TNRO - 145 *Coelogyne trinervis*
58. TNRO - 146 *Dendrobium indivisum*
59. TNRO - 147 *Tainia angustifolia*
60. TNRO - 148 *Sapthoglottis affinis*
61. TNRO - 149 *Dendrobium pachyglossum*
62. TNRO - 150 *Habenaria myriotricha*
63. TNRO - 156 *Dendrobium scabrilingue*
64. TNRO - 158 *Arundina graminifolia*
65. TNRO - 159 *Bulbophyllum blepharistes*
66. TNRO - 160 *Bulbophyllum crassipes*
67. TNRO - 161 *Eria xanthocheila*
68. TNRO - 163 *Zeuzine affinis*
69. TNRO - 181 *Trias nasuta*
70. TNRO - 184 *Porpax elwesii*
71. TNRO - 189 *Calanthe vestita*
72. TNRO - 191 *Thrixspermum centipeda*
73. TNRO - 194 *Bulbophyllum tripaleum*

(Total – 73 Orchid Species)

Fig. (9) List of T N R Orchid Herbarium Collections

1. TNRO- 29 *Dendrobium fimbriatum*
2. TNRO – 40 *Pholidota imbricata*
3. TNRO – 47 *Liparis vestita*
4. TNRO – 67 *Eria obesa*
5. TNRO – 76 *Bulbophyllum* sp.
6. TNRO – 78 *Dendrobium incurvum*
7. TNRO – 103 *Dainia latifolia*
8. TNRO – 104 *Geodorum* sp.
9. TNRO – 105 *Brachycorythis helferi*
10. TNRO – 107 *Tropidia curculigoides*
11. TNRO – 109 *Peristylus* sp.
12. TNRO – 110 *Apostasia wallichii*
13. TNRO – 111 *Eria* sp.
14. TNRO – 116 *Peristylus goodyeroides*
15. TNRO – 117 *Brachycorythis* sp.
16. TNRO – 118 *Malaxis* sp.
17. TNRO – 119 *Malaxis* sp.
18. TNRO – 124 *Calanthe* sp.
19. TNRO – 126 *Dendrobium moschatum*
20. TNRO – 136 *Luisia* sp.
21. TNRO – 137 *Bulbophyllum* sp.
22. TNRO – 138 *Aerides* sp.
23. TNRO – 139 *Peristylus* sp.
24. TNRO – 140 *Habenaria* sp.
25. TNRO – 143 *Aerides* sp.
26. TNRO – 144 *Cleisostoma* sp.
27. TNRO – 145 *Coelogyne trinervis*
28. TNRO – 146 *Dendrobium indivisum*
29. TNRO – 147 *Tainia angustifolia*
30. TNRO – 148 *Spathoglottis affinis*
31. TNRO – 149 *Dendrobium pachyglossum*
32. TNRO – 150 *Habenaria myriotricha*
33. TNRO – 151 *Peristylus* sp.
34. TNRO – 153 *Calanthe* sp.
35. TNRO – 158 *Arundina graminifolia*
36. TNRO – 159 *Bulbophyllum blepharistes*
37. TNRO – 160 *Bulbophyllum crassipes*
38. TNRO – 161 *Eria xanthocheila*
39. TNRO – 162 *Bulbophyllum* sp.
40. TNRO – 163 *Zeuzine affinis*
41. TNRO – 164 *Panisea* sp.
42. TNRO – 165 *Coelogyne* sp.
43. TNRO – 170 *Trias* sp.
44. TNRO – 179 *Oberonia* sp.

45. TNRO – 181 *Trias nasuta*
46. TNRO – 182 *Oberonia* sp.
47. TNRO – 183 *Bulbophyllum* sp.
48. TNRO – 184 *Porpax elwesii*
49. TNRO – 189 *Calanthe vestita*
50. TNRO – 192 *Bulbophyllum* sp.

(Total – 50 Orchid Herbarium sheets)

(Fig. 10) List of T N R Orchid Flower Spirit Collections

1. TNRO – 1 *Trias picta*
2. TNRO – 2 *Acriopsis javanica*
3. TNRO – 3 *Dendrobium tortile*
4. TNRO – 4 *Bulbophyllum* sp.
5. TNRO – 5 *Stereosandra javanica*
6. TNRO – 11 *Dendrobium devonianum*
7. TNRO – 12 *Dendrobium farmeri*
8. TNRO – 18 *Bulbophyllum craibianum*
9. TNRO – 19 *Dendrobium* sp.
10. TNRO – 31 *Cymbidium aloifolium*
11. TNRO – 34 *Phalaenopsis cornu-cervi*
12. TNRO – 40 *Pholidota imbricata*
13. TNRO – 57 *Renanthera coccinea*
14. TNRO – 58 *Didymoplexis pallens*
15. TNRO – 61 *Micropera* sp.
16. TNRO – 63 *Luisia* sp.
17. TNRO – 67 *Eria obesa*
18. TNRO – 73 *Thrixpermum trichoglottis*
19. TNRO – 78 *Dendrobium incurvum*
20. TNRO – 79 *Aerides falcata*
21. TNRO – 81 *Dendrobium acerosum*
22. TNRO – 90 *Coelogyne flavida*
23. TNRO – 102 *Acriopsis carrii*
24. TNRO – 105 *Brachycorythis helferi*
25. TNRO – 107 *Tropidia curculigoides*
26. TNRO – 110 *Apostasia wallichii*
27. TNRO – 111 *Eria* sp.
28. TNRO – 115 *Porpax lanii*
29. TNRO – 117 *Brachycorythis* sp.
30. TNRO – 118 *Malaxis* sp.
31. TNRO – 124 *Calanthe* sp.
32. TNRO – 126 *Dendrobium moschatum*
33. TNRO – 127 *Micropera obtusa*
34. TNRO – 137 *Bulbophyllum* sp.
35. TNRO – 139 *Peristylus* sp.
36. TNRO – 140 *Habenaria* sp.
37. TNRO – 144 *Cleisostoma* sp.
38. TNRO – 145 *Coelogyne trinervis*
39. TNRO – 147 *Tainia angustifolia*
40. TNRO – 148 *Spathoglottis affinis*
41. TNRO – 150 *Habenaria myriotricha*
42. TNRO – 151 *Peristylus* sp.
43. TNRO – 153 *Calanthe* sp.

44. TNRO – 158 *Arundina graminifolia*
45. TNRO – 159 *Bulbophyllum blepharistes*
46. TNRO – 161 *Eria xanthocheila*
47. TNRO – 162 *Bulbophyllum* sp.
48. TNRO – 165 *Coelogyne* sp.
49. TNRO – 168 *Trias* sp.
50. TNRO - 169 *Trias* sp.
51. TNRO - 170 *Trias* sp.
52. TNRO – 179 *Oberonia* sp.
53. TNRO – 181 *Trias nasuta*
54. TNRO – 182 *Oberonia* sp.
55. TNRO – 184 *Porpax elwesii*
56. TNRO – 191 *Thrixspermum centipeda*
57. TNRO – 192 *Bulbophyllum* sp.

(Total 57 spirit bottles)

Table. 1 Information data of Collected Orchids in TNR Orchid Survey

No.	Code No.	Scientific Name	L	S	H	Place	GPS Position	Elevation	Trip
1	TNRO-1	*Trias picta*	√	√		Nat Eain Taung	N 14˙ 40′ 54.5″ E 098˙ 21′ 45.5″	3040′	1st Trip
2	TNRO-2	*Acriopsis javanica*	√	√		Ye Bone-Sakhan Gyi Trip	N 14˙ 33′ 17.0″ E 098˙ 11′ 53.5″	137′	1st Trip
3	TNRO-3	*Dendrobium tortile*	√	√		Ye Bone-Sakhan Gyi Trip	N 14˙ 31′ 57.8″ E 098˙ 13′ 54.6″	283′	1st Trip
4	TNRO-4	*Bulbophyllum* sp.	√	√		Ye Bone-Sakhan Gyi Trip	N 14˙ 31′ 57.8″ E 098˙ 13′ 54.7″	853′	1st Trip
5	TNRO-5	*Stereosandra javanica*		√		Ye Bone-Sakhan Gyi Trip	N 14˙ 32′ 37.4″ E 098˙ 14′ 54.9″	687′	1st Trip
6	TNRO-6	*D.crepidatum*	√			Ye Bone-Sakhan Gyi Trip	N 14˙ 32′ 36.9″ E 098˙ 14′ 55.6″	727′	1st Trip
7	TNRO-7	*D. aphyllum*	√			Ye Bone-Sakhan Gyi Trip	N 14˙ 32′ 36.9″ E 098˙ 14′ 55.6″	727′	1st Trip

8	TNRO-8	*D. parcum*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 36.9″ E 098˚ 14′ 55.6″	727′	1st Trip
9	TNRO-9	*Liparis* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 36.9″ E 098˚ 14′ 55.6″	727′	1st Trip
10	TNRO-10	*Gastrochilus* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 36.9″ E 098˚ 14′ 55.6″	770′	1st Trip
11	TNRO-11	*D. devonianum*	√	√		Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 43.6″ E 098˚ 15′ 09.7″	722′	1st Trip
12	TNRO-12	*D. farmeri*	√	√		Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 42.0″ E 098˚ 14′ 49.3″	867′	1st Trip
13	TNRO-13	*D. lindleyi*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 44.9″ E 098˚ 14′ 47.5″	992′	1st Trip
14	TNRO-14	*Bulbophyllum* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 44.9″ E 098˚ 14′ 47.5″	992′	1st Trip
15	TNRO-15	*Renanthera* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 44.9″ E 098˚ 14′ 47.5″	992′	1st Trip

16	TNRO-16	*Tropidia* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 11.5″ E 098˚ 15′ 44.7″	777′	1st Trip
17	TNRO-17	*D. chrysotoxum*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 05.5″ E 098˚ 15′ 55.6″	691′	1st Trip
18	TNRO-18	*Bulbophyllum craibianum*	√	√		Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 05.5″ E 098˚ 15′ 55.6″	719′	1st Trip
19	TNRO-19	*D.* sp.	√	√		Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 41.3″ E 098˚ 16′ 29.3″	787′	1st Trip
20	TNRO-20	*Agrostophyllum* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 51.3″ E 098˚ 16′ 05.2″	611′	1st Trip
21	TNRO-21	*Agrostophyllum* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 51.3″ E 098˚ 16′ 05.2″	611′	1st Trip
22	TNRO-22	*Bulbophyllum* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 28.8″ E 098˚ 17′ 02.0″	574′	1st Trip
23	TNRO-23	*Acampe* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 28.8″ E 098˚ 17′ 02.0″	574′	1st Trip

24	TNRO-24	*Epigeneium* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 28.8″ E 098˚ 17′ 02.0″	574′	1st Trip
25	TNRO-25	*Liparis* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 28.8″ E 098˚ 17′ 02.0″	574′	1st Trip
26	TNRO-26	*Porpax* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 28.8″ E 098˚ 17′ 02.2″	574′	1st Trip
27	TNRO-27	*Porpax* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 28.8″ E 098˚ 17′ 02.0″	574′	1st Trip
28	TNRO-28	*Oberonia* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 28.8″ E 098˚ 17′ 02.2″	574′	1st Trip
29	TNRO-29	*D. fimbriatum*	√		√	Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 28.8″ E 098˚ 17′ 02.0″	574′	1st Trip
30	TNRO-30	*Gastrochilus* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 28.8″ E 098˚ 17′ 02.2″	574′	1st Trip
31	TNRO-31	*Cymbidium aloifolium*	√	√		Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 28.8″ E 098˚ 17′ 02.0″	574′	1st Trip

32	TNRO-32	*Bulbophyllum* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 28.8″ E 098˚ 17′ 02.0″	574′	1st Trip
33	TNRO-33	*Trias* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 28.8″ E 098˚ 17′ 02.2″	574′	1st Trip
34	TNRO-34	*Phalaenopsis cornu-cervi*	√	√		Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
35	TNRO-35	*Panisea uniflora*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
36	TNRO-36	*Pholidota articulata*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
37	TNRO-37	*Eria biflora*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
38	TNRO-38	*Rhyncostylis retusa*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
39	TNRO-39	*Liparis sp.*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip

40	TNRO-40	*Pholidota imbricata*	√	√	√	Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
41	TNRO-41	*D. pulchellum*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
42	TNRO-42	*Coelogyne* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
43	TNRO-43	*Eria* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
44	TNRO-44	*D.* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
45	TNRO-45	*D. bilobulatum*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
46	TNRO-46	*Eria tomentosa*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
47	TNRO-47	*Liparis vestita*	√		√	Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip

48	TNRO-48	*Bulbophyllum* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
49	TNRO-49	*D.* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
50	TNRO-50	*Trichoglottis* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
51	TNRO-51	*Trichoglottis* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
52	TNRO-52	*Bulbophyllum* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
53	TNRO-53	Vandaceous ?	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
54	TNRO-54	*Cirrhopetalum* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
55	TNRO-55	Vandaceous ?	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip

56	TNRO-56	Vandaceous ?	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
57	TNRO-57	*Renanthera coccinea*	√	√		Ye Bone-Sakhan Gyi Trip	N 14˚ 31′ 29.7″ E 098˚ 17′ 03.3″	585′	1st Trip
58	TNRO-58	*Didymoplexis pallens*		√		Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 26.7″ E 098˚ 15′ 08.5″	712′	1st Trip
59	TNRO-59	*Papilionanthe teres*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 26.7″ E 098˚ 15′ 08.5″	712′	1st Trip
60	TNRO-60	*Trichoglottis* sp.	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 26.7″ E 098˚ 15′ 08.5″	712′	1st Trip
61	TNRO-61	*Micropera* sp.	√	√		Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 26.7″ E 098˚ 15′ 08.5″	712′	1st Trip
62	TNRO-62	*Bulbophyllum auricomum*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 26.7″ E 098˚ 15′ 08.5″	712′	1st Trip
63	TNRO-63	*Luisia* sp.	√	√		Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 26.7″ E 098˚ 15′ 08.5″	712′	1st Trip

64	TNRO-64	*Smitinandia micrantha*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 26.7″ E 098˚ 15′ 08.5″	712′	1st Trip
65	TNRO-65	*Eria ornata*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 26.7″ E 098˚ 15′ 08.5″	712′	1st Trip
66	TNRO-66	*D. formosum*	√			Ye Bone-Sakhan Gyi Trip	N 14˚ 32′ 26.7″ E 098˚ 15′ 08.5″	712′	1st Trip
67	TNRO-67	*Eria obesa*	√	√	√	Service Track Trip	N 14˚ 40′ 47.9″ E 098˚ 18′ 57.3″	463′	1st Trip
68	TNRO-68	*Bulbophyllum* sp.	√			Service Track Trip	N 14˚ 40′ 47.9″ E 098˚ 18′ 57.3″	463′	1st Trip
69	TNRO-69	*D.* sp.	√			Service Track Trip	N 14˚ 40′ 47.9″ E 098˚ 18′ 57.3″	463′	1st Trip
70	TNRO-70	*Ceratostylis* sp.	√			Service Track Trip	N 14˚ 40′ 47.9″ E 098˚ 18′ 57.3″	463′	1st Trip
71	TNRO-71	*Bulbophyllum* sp.	√			Service Track Trip	N 14˚ 40′ 47.9″ E 098˚ 18′ 57.3″	463′	1st Trip

72	TNRO-72	*D. primulinum*	√			Service Track Trip	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″	592′	1st Trip
73	TNRO-73	*Thrixspermum trichoglottis*	√	√		Service Track Trip	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″	592′	1st Trip
74	TNRO-74	*Cleisomeria pilosulum*	√			Service Track Trip	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″	592′	1st Trip
75	TNRO-75	*Luisia* sp.	√			Service Track Trip	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″	592′	1st Trip
76	TNRO-76	*Bulbophyllum* sp.	√		√	Service Track Trip	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″	592′	1st Trip
77	TNRO-77	*D.* sp.	√			Service Track Trip	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″	592′	1st Trip
78	TNRO-78	*D. incurvum*	√	√	√	Service Track Trip	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″	592′	1st Trip
79	TNRO-79	*Aerides falcata*	√	√		Service Track Trip	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″	592′	1st Trip

80	TNRO-80	*Acampe rigida*	√			Service Track Trip	N 14˙ 39′ 32.0″ E 098˙ 20′ 07.9″	592′	1st Trip
81	TNRO-81	*D. acerosum*	√	√		Service Track Trip	N 14˙ 39′ 31.7″ E 098˙ 20′ 09.5″	573′	1st Trip
82	TNRO-82	*D.* sp.	√			Service Track Trip	N 14˙ 39′ 31.7″ E 098˙ 20′ 09.5″	573′	1st Trip
83	TNRO-83	*Gastrochilus* sp.	√			Service Track Trip	N 14˙ 39′ 31.7″ E 098˙ 20′ 09.5″	573′	1st Trip
84	TNRO-84	*Liparis* sp.	√			Service Track Trip	N 14˙ 39′ 31.7″ E 098˙ 20′ 09.5″	573′	1st Trip
85	TNRO-85	*Cirrhopetalum* sp.	√			Service Track Trip	N 14˙ 39′ 31.7″ E 098˙ 20′ 09.5″	573′	1st Trip
86	TNRO-86	*Trichotosia* sp.	√			Service Track Trip	N 14˙ 39′ 31.7″ E 098˙ 20′ 09.5″	573′	1st Trip
87	TNRO-87	*Epigeneium* sp.	√			Service Track Trip	N 14˙ 39′ 31.7″ E 098˙ 20′ 09.5″	573′	1st Trip

88	TNRO-88	*Epigeneium* sp. no.(2)	√			Service Track Trip	N 14˚ 39′ 31.7″ E 098˚ 20′ 09.5″	573′	1st Trip
89	TNRO-89	*Bulbophyllum* sp.	√			Service Track Trip	N 14˚ 39′ 31.7″ E 098˚ 20′ 09.5″	573′	1st Trip
90	TNRO-90	*Coelogyne flavida*	√	√		Service Track Trip	N 14˚ 39′ 48.5″ E 098˚ 20′ 38.4″	924′	1st Trip
91	TNRO-91	*Coelogyne* sp.	√			Service Track Trip	N 14˚ 39′ 48.5″ E 098˚ 20′ 38.4″	924′	1st Trip
92	TNRO-92	*Eria siamensis*	√			Service Track Trip	N 14˚ 39′ 48.5″ E 098˚ 20′ 38.4″	924′	1st Trip
93	TNRO-93	*Kingidium deliciosum*	√			Service Track Trip	N 14˚ 39′ 48.5″ E 098˚ 20′ 38.4″	924′	1st Trip
94	TNRO-94	*Ascocentrum curvifolium*	√			Service Track Trip	N 14˚ 41′ 58.2″ E 098˚ 08′ 06.3″	75′	1st Trip
95	TNRO-95	*Cirrhopetalum* sp.	√			Service Track Trip	N 14˚ 41′ 58.2″ E 098˚ 08′ 06.3″	75′	1st Trip

96	TNRO-96	*Trichotosia* sp.	√			Service Track Trip	N 14˚ 41′ 58.2″ E 098˚ 08′ 06.3″	75′	1st Trip
97	TNRO-97	*Oberonia* sp.	√			Service Track Trip	N 14˚ 41′ 58.2″ E 098˚ 08′ 06.3″	75′	1st Trip
98	TNRO-98	*D. pachyphyllum*	√			Kalainaung Pagoda Area	N 14˚ 41′ 57.8″ E 098˚ 08′ 05.6″	507′	1st Trip
99	TNRO-99	*Flickingeria* sp.	√			Kalainaung Pagoda Area	N 14˚ 41′ 57.8″ E 098˚ 08′ 05.6″	507′	1st Trip
100	TNRO-100	Vandaceous ?	√			Kalainaung Pagoda Area	N 14˚ 41′ 57.8″ E 098˚ 08′ 05.6″	507′	1st Trip
101	TNRO-101	*Coelogyne schilleriana*	√			Kalainaung Pagoda Area	N 14˚ 41′ 57.8″ E 098˚ 08′ 05.6″	507′	1st Trip
102	TNRO-102	*Acriopsis carrii*	√	√		Kalainaung Pagoda Area	N 14˚ 41′ 57.8″ E 098˚ 08′ 05.6″	507′	1st Trip
103	TNRO-103	*Dainia latifolia*			√	Hein Ze Sakhan	N 14˚ 28′ 56.5″ E 098˚ 11′ 29.1″	228′	2nd Trip

104	TNRO-104	*Geodorum* sp.	√		√	Hein Ze Sakhan	N 14˚ 28′ 39.6″ E 098˚ 12′ 19.1″	220′	2nd Trip
105	TNRO-105	*Brachycorythis helferi*		√	√	Hein Ze Sakhan	N 14˚ 28′ 39.6″ E 098˚ 21′ 19.1″	220′	2nd Trip
106	TNRO-106	*Luisia* sp.				Hein Ze Sakhan	N 14˚ 27′ 49.7″ E 098˚ 13′ 23.5″	178′	2nd Trip
107	TNRO-107	*Tropidia curculigoides*	√	√	√	Hein Ze Sakhan	N 14˚ 27′ 49.7″ E 098˚ 13′ 23.5″	178′	2nd Trip
108	TNRO-108	*Eria* sp.	√			Hein Ze Sakhan	N 14˚ 27′ 49.0″ E 098˚ 13′ 22.7″	213′	2nd Trip
109	TNRO-109	*Peristylus* sp.	√		√	Hein Ze Sakhan	N 14˚ 27′ 49.0″ E 098˚ 13′ 22.7″	213′	2nd Trip
110	TNRO-110	*Apostasia wallichii*		√	√	Hein Ze Sakhan	N 14˚ 27′ 49.0″ E 098˚ 13′ 22.7″	213′	2nd Trip
111	TNRO-111	*Eria* sp.		√	√	Hein Ze Sakhan	N 14˚ 27′ 49.0″ E 098˚ 13′ 22.7″	213′	2nd Trip

112	TNRO-112	*Micropera* sp.	√			Hein Ze Sakhan	N 14˚ 28′ 21.9″ E 098˚ 13′ 08.3″	252′	2nd Trip
113	TNRO-113	*Bulbophyllum* sp.	√			Hein Ze Sakhan	N 14˚ 28′ 28.9″ E 098˚ 13′ 03.2″	209′	2nd Trip
114	TNRO-114	Vandaceous ?	√			Hein Ze Sakhan	N 14˚ 28′ 37.9″ E 098˚ 12′ 58.1″	103′	2nd Trip
115	TNRO-115	*Porpax lanii*		√		Hein Ze Sakhan	N 14˚ 28′ 16.5″ E 098˚ 13′ 51.5″	193′	2nd Trip
116	TNRO-116	*Peristylus goodyeroides*			√	Ma Yan Chaung Ywar	N 14˚ 45′ 35.8″ E 098˚ 06′ 03.0″	425′	2nd Trip
117	TNRO-117	*Brachycorythis* sp.		√	√	Ma Yan Chaung Ywar	N 14˚ 45′ 35.8″ E 098˚ 06′ 03.0″	425′	2nd Trip
118	TNRO-118	*Malaxis* sp.		√	√	Ma Yan Chaung Ywar	N 14˚ 45′ 40.5″ E 098˚ 06′ 01.1″	481′	2nd Trip
119	TNRO-119	*Malaxis* sp.			√	Ma Yan Chaung Ywar	N 14˚ 45′ 40.5″ E 098˚ 06′ 01.1″	481′	2nd Trip

120	TNRO-120	*Bulbophyllum* sp.	√			Mile 60 Ywar	N 14˚ 48′ 52.0″ E 098˚ 03′ 21.8″	184′	2nd Trip
121	TNRO-121	*Trichoglottis* sp.	√			Yaphu Ywar (Old)	N 14˚ 51′ 48.8″ E 098˚ 03′ 12.8″	156′	2nd Trip
122	TNRO-122	*Rhynchostylis* sp.	√			Yaphu Ywar (Old)	N 14˚ 51′ 48.8″ E 098˚ 03′ 12.8″	156′	2nd Trip
123	TNRO-123	*Dendrobium* sp.	√			Yaphu Ywar (Old)	N 14˚ 51′ 48.8″ E 098˚ 03′ 12.8″	156′	2nd Trip
124	TNRO-124	*Calanthe* sp.	√	√	√	Yaphu Ywar (Old)	N 14˚ 51′ 48.8″ E 098˚ 03′ 12.8″	156′	2nd Trip
125	TNRO-125	*Habenaria* sp.	√			Yaphu Ywar (Old)	N 14˚ 50′ 18.7″ E 098˚ 04′ 08.0″	155′	2nd Trip
126	TNRO-126	*D. moschatum*	√	√	√	Kin Chaung	N 14˚ 50′ 57.5″ E 098˚ 04′ 00.4″	139′	2nd Trip
127	TNRO-127	*Micropera obtusa*	√	√		Zin Bar Ywar	N 14˚ 37′ 46.5″ E 098˚ 10′ 22.2″	67′	2nd Trip

128	TNRO-128	*Bulbophyllum* sp.	√			Zin Bar Ywar	N 14˙ 37′ 46.5″ E 098˙ 10′ 22.2″	67′	2nd Trip
129	TNRO-129	*Bulbophyllum* sp.	√			Zin Bar Ywar	N 14˙ 37′ 46.5″ E 098˙ 10′ 22.2″	67′	2nd Trip
130	TNRO-130	*Eria* sp.	√			Zin Bar Ywar	N 14˙ 37′ 46.5″ E 098˙ 10′ 22.2″	67′	2nd Trip
131	TNRO-131	*Agrostophyllum planicaule*	√			Zin Bar Ywar	N 14˙ 37′ 46.5″ E 098˙ 10′ 22.2″	67′	2nd Trip
132	TNRO-132	*Dendrobium* sp.	√			Zin Bar Ywar	N 14˙ 37′ 46.5″ E 098˙ 10′ 22.2″	67′	2nd Trip
133	TNRO-133	*Eria globulifera*	√			Zin Bar Ywar	N 14˙ 37′ 46.5″ E 098˙ 10′ 22.2″	67′	2nd Trip
134	TNRO-134	*Dendrobium* sp.	√			Zin Bar Ywar	N 14˙ 37′ 46.5″ E 098˙ 10′ 22.2″	67′	2nd Trip
135	TNRO-135	*Thrixspermum* sp.	√			Mi Chaung Laung Ywar	N 14˙ 40′ 36.9″ E 098˙ 08′ 30.4″	90′	2nd Trip

136	TNRO-136	*Luisia* sp.	√		√	Mi Chaung Laung Ywar	N 14˙ 40′ 36.9″ E 098˙ 08′ 30.4″	90′	2nd Trip
137	TNRO-137	*Bulbophyllum* sp.	√	√	√	Mi Chaung Laung Ywar	N 14˙ 40′ 36.9″ E 098˙ 08′ 30.4″	90′	2nd Trip
138	TNRO-138	*Aerides* sp.	√		√	Mi Chaung Laung Ywar	N 14˙ 40′ 36.9″ E 098˙ 08′ 30.4″	90′	2nd Trip
139	TNRO-139	*Peristylus* sp.	√	√	√	Mi Chaung Laung Ywar	N 14˙ 41′ 18.8″ E 098˙ 09′ 02.3″	277′	3rd Trip
140	TNRO-140	*Habenaria* sp.	√	√	√	Mi Chaung Laung Ywar	N 14˙ 41′ 24.6″ E 098˙ 09′ 06.2″	193′	3rd Trip
141	TNRO-141	*Malaxis* sp.	√			Mi Chaung Laung Ywar	N 14˙ 41′ 04.6″ E 098˙ 09′ 11.0″	213′	3rd Trip
142	TNRO-142	*Geodorum* sp.	√			Mi Chaung Laung Ywar	N 14˙ 41′ 11.2″ E 098˙ 09′ 28.8″	260′	3rd Trip
143	TNRO-143	*Aerides* sp.	√		√	Mi Chaung Laung Ywar	N 14˙ 41′ 10.3″ E 098˙ 09′ 34.8″	413′	3rd Trip

144	TNRO-144	*Cleisostoma* sp.	√	√	√	Mi Chaung Laung Ywar	N 14˙ 40′ 23.1″ E 098˙ 09′ 34.0″	201′	3rd Trip
145	TNRO-145	*Coelogyne trinervis*	√	√	√	Yae Kan Taung	N 14˙ 35′ 18.8″ E 098˙ 02′ 16.9″	646′	3rd Trip
146	TNRO-146	*Dendrobium indivisum*	√		√	Yae Kan Taung	N 14˙ 35′ 09.3″ E 098˙ 02′ 17.7″	916′	3rd Trip
147	TNRO-147	*Tainia angustifolia*	√	√	√	Yae Kan Taung	N 14˙ 35′ 02.1″ E 098˙ 02′ 17.6″	988′	3rd Trip
148	TNRO-148	*Spathoglottis affinis*	√	√	√	Yae Kan Taung	N 14˙ 34′ 56.8″ E 098˙ 02′ 20.3″	1161′	3rd Trip
149	TNRO-149	*Dendrobium pachyglossum*	√		√	Yae Kan Taung	N 14˙ 34′ 43.2″ E 098˙ 02′ 24.3″	1356′	3rd Trip
150	TNRO-150	*Habenaria myrotricha*	√	√	√	Yae Kan Taung	N 14˙ 33′ 52.1″ E 098˙ 02′ 36.6″	2104′	3rd Trip
151	TNRO-151	*Peristylus* sp.	√	√	√	Yae Kan Taung	N 14˙ 33′ 40.8″ E 098˙ 02′ 42.9″	2114′	3rd Trip

152	TNRO-152	*Tainia* sp.	√			Yae Kan Taung	N 14˚ 33′ 29.4″ E 098˚ 02′ 48.3″	2075′	3rd Trip
153	TNRO-153	*Calanthe* sp.	√	√	√	Yae Kan Taung	N 14˚ 33′ 12.8″ E 098˚ 02′ 50.9″	2300′	3rd Trip
154	TNRO-154	*Bulbophyllum* sp.	√			Yae Kan Taung	N 14˚ 33′ 12.8″ E 098˚ 02′ 50.9″	2300′	3rd Trip
155	TNRO-155	*Bulbophyllum* sp.	√			Yae Kan Taung	N 14˚ 33′ 12.8″ E 098˚ 02′ 50.9″	2300′	3rd Trip
156	TNRO-156	*Dendrobium scabrilingue*	√			Yae Kan Taung	N 14˚ 33′ 04.1″ E 098˚ 02′ 48.2″	2233′	3rd Trip
157	TNRO-157	*Eulophia* sp.	√			Yae Kan Taung	N 14˚ 33′ 04.1″ E 098˚ 02′ 48.2″	2233′	3rd Trip
158	TNRO-158	*Arundina graminifolia*	√	√	√	Yae Kan Taung	N 14˚ 33′ 10.9″ E 098˚ 02′ 59.9″	2166′	3rd Trip
159	TNRO-159	*Bulbophyllum blepharistes*	√	√	√	Yae Kan Taung	N 14˚ 35′ 14.6″ E 098˚ 02′ 16.8″	709′	4th Trip

160	TNRO-160	*Bulbophyllum crassipes*			√	Yae Kan Taung	N 14˙ 35′ 03.9″ E 098˙ 02′ 18.1″	1010′	4th Trip
161	TNRO-161	*Eria xanthocheila*		√	√	Yae Kan Taung	N 14˙ 34′ 51.1″ E 098˙ 02′ 22.8″	1310′	4th Trip
162	TNRO-162	*Bulbophyllum* sp.		√	√	Yae Kan Taung	N 14˙ 34′ 44.5″ E 098˙ 02′ 24.0″	1318′	4th Trip
163	TNRO-163	*Zeuzine affinis*			√	Yae Kan Taung	N 14˙ 33′ 12.9″ E 098˙ 02′ 51.0″	2298′	4th Trip
164	TNRO-164	*Panisea* sp.	√		√	Yae Kan Taung	N 14˙ 33′ 04.1″ E 098˙ 02′ 48.2″	2233′	4th Trip
165	TNRO-165	*Coelogyne* sp.	√	√	√	Yae Kan Taung	N 14˙ 33′ 04.1″ E 098˙ 02′ 48.2″	2233′	4th Trip
166	TNRO-166	*Bulbophyllum* sp.	√			Yae Kan Taung	N 14˙ 33′ 04.1″ E 098˙ 02′ 48.2″	2233′	4th Trip
167	TNRO-167	*Coelogyne* sp.	√			Yae Kan Taung	N 14˙ 33′ 04.1″ E 098˙ 02′ 48.2″	2233′	4th Trip

168	TNRO-168	*Trias* sp.	√	√		Yae Kan Taung	N 14˚ 33′ 05.1″ E 098˚ 02′ 46.9″	2212′	4th Trip
169	TNRO-169	*Trias* sp.	√	√		Yae Kan Taung	N 14˚ 32′ 38.4″ E 098˚ 02′ 54.7″	2223′	4th Trip
170	TNRO-170	*Trias* sp.	√	√	√	Yae Kan Taung	N 14˚ 32′ 38.4″ E 098˚ 02′ 54.7″	2223′	4th Trip
171	TNRO-171	*Bulbphyllum* sp.	√			Yae Kan Taung	N 14˚ 32′ 38.4″ E 098˚ 02′ 54.7″	2223′	4th Trip
172	TNRO-172	*Oberonia* sp.	√			Yae Kan Taung	N 14˚ 32′ 38.4″ E 098˚ 02′ 54.7″	2223′	4th Trip
173	TNRO-173	*Bulbophyllum* sp.	√			Yae Kan Taung	N 14˚ 32′ 38.4″ E 098˚ 02′ 54.7″	2223′	4th Trip
174	TNRO-174	*Flickingeria* sp.	√			Yae Kan Taung	N 14˚ 32′ 38.4″ E 098˚ 02′ 54.7″	2223′	4th Trip
175	TNRO-175	*Porpax* sp.	√			Yae Kan Taung	N 14˚ 32′ 38.4″ E 098˚ 02′ 54.7″	2223′	4th Trip

176	TNRO-176	*Porpax* sp.	√			Yae Kan Taung	N 14˙ 32′ 38.4″ E 098˙ 02′ 54.7″	2223′	4th Trip
177	TNRO-177	*Trichoglottis* sp.	√			Yae Kan Taung	N 14˙ 32′ 38.4″ E 098˙ 02′ 54.7″	2223′	4th Trip
178	TNRO-178	*Dendrobium aphyllum*	√			Talaing Ya	N 14˙ 19′ 52.6″ E 098˙ 14′ 24.5″	279′	4th Trip
179	TNRO-179	*Oberonia* sp.		√	√	Talaing Ya	N 14˙ 19′ 52.6″ E 098˙ 14′ 24.5″	279′	4th Trip
180	TNRO-180	*Dendrobium* sp.	√			Talaing Ya	N 14˙ 19′ 52.6″ E 098˙ 14′ 24.5″	279′	4th Trip
181	TNRO-181	*Trias nasuta*	√	√	√	Talaing Ya	N 14˙ 20′ 25.0″ E 098˙ 14′ 37.4″	236′	4th Trip
182	TNRO-182	*Oberonia* sp.	√	√	√	Talaing Ya	N 14˙ 20′ 25.0″ E 098˙ 14′ 37.4″	236′	4th Trip
183	TNRO-183	*Bulbophyllum* sp.	√		√	Kyauk Phyu Chaung Wa	N 14˙ 20′ 35.6″ E 098˙ 14′ 35.6″	244′	4th Trip

184	TNRO-184	*Porpax elwesii*	√	√	√	Kyauk Phyu Chaung Wa	N 14˙ 20′ 35.6″ E 098˙ 14′ 35.6″	244′	4th Trip
185	TNRO-185	*Renanthera* sp.	√			Talaing Ya Chaung	N 14˙ 20′ 46.2″ E 098˙ 14′ 26.0″	336′	4th Trip
186	TNRO-186	*Aerides* sp.	√			Talaing Ya Chaung	N 14˙ 20′ 49.1″ E 098˙ 14′ 26.4″	381′	4th Trip
187	TNRO-187	*Bulbophyllum* sp.	√			Talaing Ya Chaung	N 14˙ 20′ 49.1″ E 098˙ 14′ 26.4″	381′	4th Trip
188	TNRO-188	*Bulbophyllum* sp.	√			Talaing Ya Chaung	N 14˙ 20′ 59.0″ E 098˙ 14′ 31.4″	547′	4th Trip
189	TNRO-189	*Calanthe vestita*	√		√	Talaing Ya Chaung	N 14˙ 21′ 10.6″ E 098˙ 14′ 21.5″	540′	4th Trip
190	TNRO-190	*Cleisostoma* sp.	√			I Wyne Chaung	N 14˙ 20′ 54.7″ E 098˙ 14′ 10.6″	337′	4th Trip
191	TNRO-191	*Thrxispermum centipeda*	√	√		I Wyne Chaung	N 14˙ 20′ 48.6″ E 098˙ 14′ 14.4″	342′	4th Trip

CHAPTER 5

DISCUSSION

Although some of the TNR area especially buffer zone near the human settlement have been encroached by human activities, much of TNR area still in primary forest situation and various wild orchids thriving naturally.

It is noted no commercial scale orchid collection occurs in TNR, however some prominent native orchids like Thazin orchid (*Bulbophyllum auricomum*) that have being collected by local people are sold through traders to big cities such as Yangon, Mandalay, Mawlamyine, Dawei and so on. In Yangon, among the native orchid growers, Kalainaung Thazin is very popular due to its long spray with pure white color. Orchid growers of Yangon said that they believed that Kalainaung Thazin was the best Thazin although many varieties came from different places.

Myanmar people (women) are very fond of wearing Thazin spikes on their hair do when they have a chance to attend wedding ceremonies, convocation, state level ceremonies and occasions. The demand on Thazin would be more and more in the future. The big demand leads to over collection and depletion in natural habitat. The market demand for Thazin pseudobulbs grows annually. The Thazin growing season starts in Yangon in April – May. During the growing season, the price of Thazin pseudobulbs rises up to 50,000 Kyats to 120,000 Kyats for special grade per viss. Although Thazin pseudobulbs price rise like sky rocket, the Thzain commercial growers are buying with the very good price due to good income of selling the Thazin flower spikes. Excellent Thazin flower spikes can get 3000 Kyats/spikes in the early flowering period.

It was noticed that an experience on Thazin status at 34 miles area on the Service Track Road. Local people who accompanied with us said Thazin orchid population in that area was abundant up to last three years. However, nearly all were gone due to over collection when we arrived there. Only the low grade Thazin pseudobulbs remained and it tend to extinct in this area if the over collection carried continuously. Not only in this place, but also in other places, Thazin population declined dramatically, we noticed. We feel that the existing and future of Thazin in this area would be in endanger status.

According to interview with local people and reliable information, another native orchid species; *Dendrobium excile* and very similar *Dendrobium* have been collected since last 3 years ago and traders try to buy.

Some traders have purchased this kind of orchid with 5000 Kyats/Viss. This species is very similar to the one get the high price in Chin State. In Chin State, this kind of *Dendrobium* species was called as shrimp orchid (Puzon Thitkhwa) because of its flower similar to shrimp. In Chin State, due to over collection and illegal export to China via Mandalay – Meuse route, its status is in endangered and must be concerned not to extinct.

Most of the Dendrobium orchids were believed by Chinese people as having medicinal value. So, the demand is always going up from China. It is noted that more traders are now penetrating to purchase medicinal Dendrobium species from different States and regions because the providing Dendrobium amount go down from Chin State.

It is noted that many showy and commercial value native orchids such as *Dendrobium formosum*, *D. primulinum*, *D. tortile*, *D. fameri* are still abundant and, no commercial collection occurred in TNR.

Both sides of the forest along the Service Track road are still untouched and well preserved due to tight security situation.

It is learnt that some elders said they used to apply *Cymbidium* species as medicinal purpose before. But now, everybody can easily purchase foreign medicines and Myanmar folk medicines. Some women are still using different *Bulbphyllum* species. They pounded the pseudobulbs of *Bulbophyllum*, then mixed and different barks and fruits to obtain natural organic shampoo. They believe that natural organic shampoo enhance and maintain the growth of hair as well as kill the dandruffs.

The local people showed that their interesting to conserve the native orchids of TNR during conservation talk and interview. It is also noted local people believed that to conserve their flora including orchids is one of their duties. This kind of local people's commitment could be the most valuable tool for conserving orchids of TNR.

CHAPTER 6

RECOMMENDATION

Orchid survey team believes that TNR area is home of native orchid diversity and like to advise to continue orchid survey under the joint cooperation between TNRP and local consultant (or) Orchid Society. One of the advantages of TNR is its altitudinal variation. It is surprised to record some cool growing wild orchids in TNR area due to altitude variation and good weather condition.

Orchid survey team members satisfy their research work, support and logistic arrangement by TNR project office and the outcomes in TNR. Although the survey period is only nine months, 73 orchid species record numbers are very good results including 6 species might be new record for Myanmar (species level), 1 species might be new record for Myanmar (genus level) and one *Calanthe* species may be new record for Science. It will take some period of time to confirm with world class taxonomists.

Most of the Myanmar native orchid flowering season is in cool season after the rainy season and summer season. The future orchid survey should be carried out in the dry season starting from end of rainy season (October) to end of summer (April/ May). However, some of the terrestrial (Ground) orchid grow and flower in rainy season. So, some orchid survey should conduct in rainy season especially for terrestrial orchids.

Due to the bad weather condition, torrential rain and rapid stream currents in rainy season, time limitation and some security reasons, orchid survey could conduct just only few areas (about 1/3 of TNR) like other National Consultants. To cover the whole TNR area, biodiversity rich Eastern mountain ridges from north to south near the Thai border should be surveyed during the dry season in future, if security permits.

Although there are no evidence of commercial scale orchid collection in TNR (few cases in some areas), more conservation knowledge distribution and sharing talks, discussions should be arranged continuously in the village adjacent to TNR. Orchid Conservation poster and information brochure (in Myanmar, Mon as well as Kayin) should be distributed to the local people to aware the conservation. We are ready to support to publish above educational materials.

Some commercially potential native orchids should be propagated with cooperation with local NGOs such as Myanmar Floriculturists Association (or) private companies by means of scientific modern propagating technology and distributed to local people for growing. By supporting of this program, local families will enjoy the extra income for their families' well being.

It showed that two orchid conservation talks and short training on orchid growing and conservation were interested by local people and TNR staff, more talks and short training should continue at least one program per year.

Orchid knowledge and conservation booth should be equipped in Environmental Education Centre at Mi-chaung Laung. We will cooperate with this task.

We, orchid survey team would like to do more research works and sharing the knowledge with TNR staff and local people if the continuous research program would be allowed in future.

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