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# Taxonomic Enumeration of Natma Taung National Park Vol. 1

Makinoa New Series  
Supplement Issue



The Kochi Prefectural Makino Botanical Garden, Japan  
& Forest Department, Ministry of Natural Resources and Environmental Conservation, Myanmar



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# Taxonomic Enumeration of Natma Taung National Park Vol. 1

Kazumi Fujikawa, Yumiko Baba, Thant Shin,  
Aung Zaw Moe & Hajime Mizukami (eds.)



The Kochi Prefectural Makino Botanical Garden (MBK) & Forest Department (FD)



## Foreword

I am delighted to have the opportunity to write a foreword for the annotated checklist entitled *Taxonomic Enumeration of Natma Taung National Park Vol. 1*.

Myanmar lies at the convergence of different ecoregions, resulting in remarkable ecological diversity and species richness. Conservation, effective management, and sustainable use are primary objectives to preserve the biological resources of Myanmar. Scientific information is the core element in conserving and managing biodiversity effectively. In this regard, the Forest Department (FD) is promoting scientific cooperation and joint research on biodiversity with international and national organizations.

The *Taxonomic Enumeration of Natma Taung National Park* is one of the fruitful results of scientific cooperation and research between the FD and the Kochi Prefectural Makino Botanical Garden (MBK) which focuses on plant diversity. This checklist is an extremely useful and important document for biological conservation in Natma Taung area.

Furthermore, this is a welcome contribution, because the more we know about the flora of Myanmar, the greater the potential to conserve and manage these valuable forest resources. I do believe that this checklist will become a valuable resource for educational purposes, a good reference for botanists and conservationists.

Last but not least, I offer my sincere gratitude to MBK for diligence and scientific rigor in producing the *Taxonomic Enumeration of Natma Taung National Park* and for enduring efforts to understand and conserve biodiversity of an important protected area. It is my hope that the FD and MBK can produce more publications from long and continuous scientific cooperation and research on the biodiversity of Myanmar.

Nyi Nyi Kyaw, Ph.D.  
Director General  
Forest Department  
Ministry of Natural Resources  
and Environmental Conservation  
The Republic of the Union of Myanmar

## Preface

Myanmar is home to an array of ecosystems, from tropical forests along the coast to alpine vegetation in the north, leading to its rich plant diversity, with over 16,000 estimated species of vascular plants. The Kochi Prefectural Makino Botanical Garden (MBK) started a joint research venture with the Forest Department of the Ministry of Forestry (currently, the Ministry of Natural Resources and Environmental Conservation), Myanmar, to unravel the plant diversity in Myanmar, by signing a memorandum of understanding in 2000.

We carried out an inventory program by collaborating with scientists and staff belonging to international and local organizations, with expeditions to Chin, Shan, Kachin, Kayin, Sagaing, and Mandalay. So far, approximately 32,000 specimens have been collected. As a result, a checklist of flowering plants in Mt. Popa was published and several new species have been described. One of the focal areas of our field expedition was the Natma Taung National Park. We started a field inventory in March 2002 and collected more than 15,500 specimens in the area in collaboration with international and local botanists.

In line with these activities, with great pleasure, the MBK is publishing the first volume of Enumeration of Natma Taung National Park Myanmar, focusing on pteridophytes and gymnosperms. I believe that this, together with the following volumes on angiosperms, will be an important step toward unraveling the flora of Myanmar. It will also help in diversity conservation and sustainable utilization of plant resources in Myanmar.

I would like to express my sincere thanks to Dr. Tetsuo Koyama, a former Director General of MBK, for the leadership to commence and operate our “Flora of Myanmar” project and to all the scientists and staff who are engaged in the project under harsh environment.

Hajime Mizukami, Ph.D.  
Director General  
The Kochi Prefectural Makino Botanical Garden

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## Part 1. Overview of Natma Taung National Park



*Rhododendron arboreum* Sm.



## The Forest of Natma Taung National Park

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Myanmar is the largest country in continental Southeast Asia at 676,578 km<sup>2</sup> and is known for its rich plant diversity. Multiple factors contribute to this diversity, including geography, topography, climate, seasonal rainfall patterns, and the presence of high mountains and major rivers. Myanmar includes a wide range of terrestrial ecosystems spanning from wet tropical forests and coastal mangroves in the south, to arid scrub in the central dry zone, to montane subtropical and temperate forests in the north (Middleton et al. 2019). Floristically, Myanmar is unique in that it represents the intersection of four floristic regions: the Indian, Sino-Japanese, South-East Asian, and Malesiana. The most recent survey of Myanmar identified over 11,800 taxa of spermatophytes in 273 families (Kress et al. 2003), and since then the discovery of 580 taxa of vascular plants and new record-based botanical explorations throughout Myanmar have been reported (Yang et al. 2020). Myanmar is thus a major global biodiversity hotspot and has been recognized for both its high conservation value and high level of threats (Myers et al. 2000).

Six forest policy imperatives prescribed by the Ministry of Natural Resources and Environmental Conservation, with the first imperative, protection, involving safeguarding water catchments, ecosystems, biodiversity, plant and animal genetic resources, soil, scenic reserves, and national heritage sites. Accordingly, the Forest Department (FD) established protected area systems represented by the National Parks and Wildlife Sanctuaries, with 45 protected areas designated so far (Forest Department 2020).

Natma Taung National Park, also known as Khaw Nu M'cung National Park, is located at 20° 45'–22° 00', E 93° 15'–94° 15' in the Chin State of western Myanmar (Fig. 1). This park was proposed in 1994 and established in 1997 (Oikos & BANCA 2011), then was officially designated a national park in 2010 and awarded ASEAN Heritage Park status in 2012 (Kang et al. 2017). This park covers 72,300 hectares of the Chin Hills, including Mt. Natma Taung (“Taung” means mountain in Myanmar), or Mt. Victoria, with an elevation ranging between 740 m and 3053 m (Oikos & BANCA 2011, Fujikawa et al. 2008) (Fig. 2). The Chin Hills form part of the Rakhine Yoma range, a fold mountain belt uplifted during the Miocene epoch that skirts the Bay of Bengal and bears northwards along Myanmar’s western border. From here, the peaks rise steadily in elevation until they meet the Himalayas in Manipur, in northeast India. The mountains in the Rakhine Yoma consist of old crystalline rocks surrounded on either side by hard, tightly-folded sedimentary rocks (Hadden 2008). The park encompasses a well-preserved biome characterized by high plant endemism and diverse forest communities (Mill 1995). Natma Taung National Park is also an important catchment for two major and nine medium and small rivers on which three million people depend for their livelihood (Oikos & BANCA 2011).

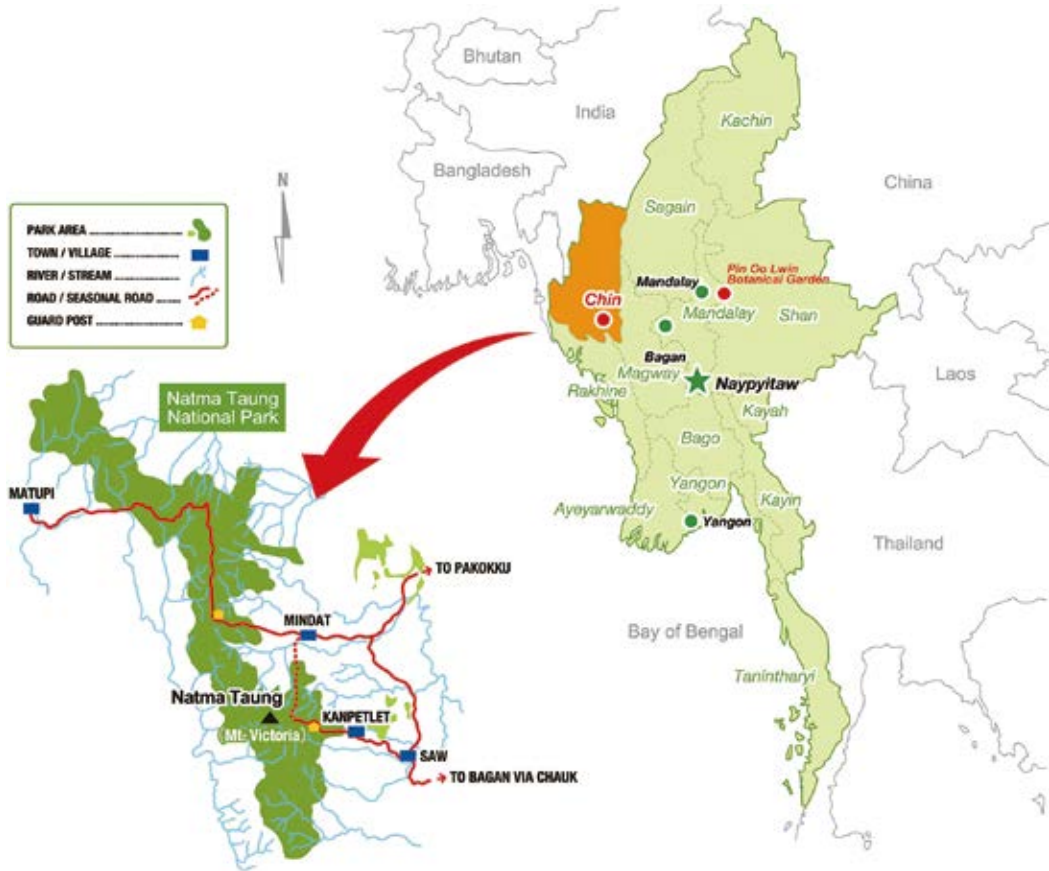


Fig. 1. Location of Natma Taung National Park in Chin State, Myanmar.

The national park office of the FD is located in Kanpetlet at an altitude of 1550 m and currently houses 32 staff members (1 park warden, 5 rangers, 6 foresters, 3 clerks, and 17 laborers) as of March of 2018. The park is managed according to an annual plan developed based on zoning principles under the management of the Nature & Wildlife Conservation Division. In the core zone, flora and fauna are regularly monitored by park staff, and biodiversity surveys are occasionally conducted with international agencies (Oikos & BANCA 2011).

This forest plays an incredibly integral role for the people living in this area. The wealth of the forest used by local communities occurs in the form of timber, food, folk medicine, farming, household good, closing, and more. The people of Natma Taung make their living mostly, or even solely, by making use of the rich resources of their surrounding forest.

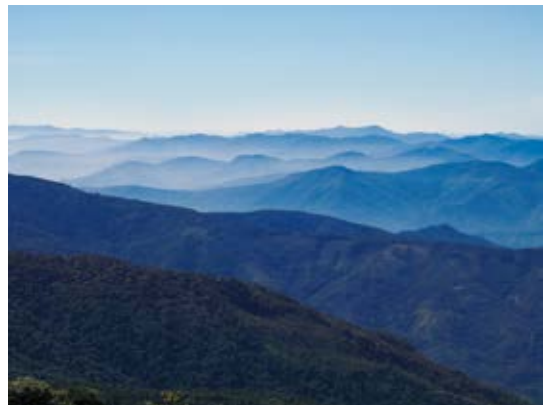


Fig. 2. View from the summit of Natma Taung (Jan. 23, 2018).

## Vegetation types of Natma Taung

Natma Taung National Park has diverse vegetation resulting from a combination of geography, elevation, and human activities. It is considered an ecological island and a refuge for various temperate species (Kingdon-Ward 1958). The vegetation of Natma Taung National Park was documented early on by Kingdon-Ward (1958), as described in previous reports by the authors (Fujikawa et al. 2008, 2012, 2014 & 2015). Vegetation types of the Natma Taung are illustrated in Fig. 3. The altitudinal ranges of main trees and shrubs in the national park based on herbarium specimens' data are shown in Appendix I.

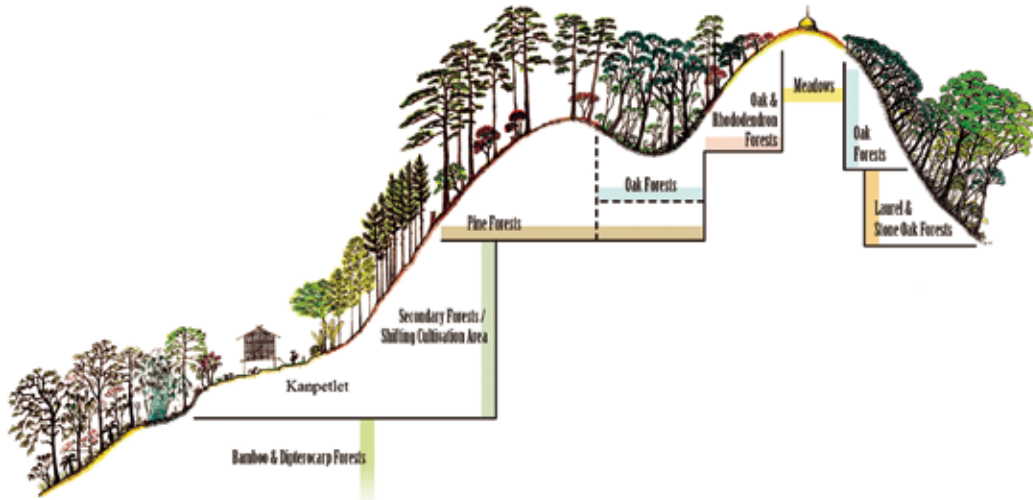


Fig. 3. Vegetation types of Natma Taung.

### Surroundings of Kanpetlet at altitudes of 1000–1800 m

Kanpetlet, with a population of ca. 5,000 people, is the gateway to the Natma Taung National Park. Situated on a ridge at an altitude of 1200 m, Kanpetlet leads to the summit of Natma Taung in the Chin Hills. The climate of the Kanpetlet area is characterized by mild temperatures and high rainfall and humidity. There are roughly three distinct seasons, hot, rainy, and cold, as in other areas of Myanmar. However, the area near experiences heavy rainfall during the rainy season due to monsoon storms coming from the Bay of Bengal. The rainy season near Kanpetlet begins slightly earlier and ends later than in other places, lasting from middle and/or late May to early December, during which humidity often surpasses 80 % (Fujikawa et al. 2009).

The area surrounding Kanpetlet is largely used to support the local human population, and little natural vegetation remains around the villages (Fig. 4). Extension of a secondary forest consisting mainly of fast-growing trees mostly with wind-dispersed seeds or re-sprouting root suckers, such as *Alnus nepalensis* D.Don (Betulaceae), *Craibiodendron stellatum* (Pierre) W.W.Sm., *Schima wallichii* Choisy, (Ericaceae), *Macaranga indica* Wight (Euphorbiaceae), *Gmelina arborea* Roxb. ex Sm. (Lamiaceae), *Engelhardia spicata* Blume (Juglandaceae), *Kydia calycina* Roxb. (Malvaceae), and *Pinus kesiya* Royle ex Gordon (Pinaceae) has occurred due to shifting cultivation, which is the main way of farming for local staples food. Roadsides are commonly covered by invasive cosmopolitan weeds, such as *Ageratina adenophora* (Spreng.) R.M.King & H.Rob., *Bidens pilosa* L. var. *minor* (Blume) Sherff, and *Chromolaena odorata* (L.) R.M. King & H.Rob. (Asteraceae).

The remaining forests on mountain slopes are composed of *Archidendron clypearia* (Jack)

I.C.Nielsen, *Dalbergia cana* Graham ex Kurz (Fabaceae), *Castanopsis fleuryi* Hickel & A.Camus, *Lithocarpus lindleyanus* (Wall. ex A.DC.) A.Cams (Fagaceae), *Lindera pulcherrima* (Nees) Hook.f., *Litsea glutinosa* (Lour.) C. B.Rob. *Phoebe lanceolata* (Nees) Nees (Lauraceae), *Schoepfia fragrans* Wall. (Olacaceae), *Bridelia glauca* Blume (Phyllanthaceae), *Ziziphus incurva* Roxb. (Rhamnaceae), *Laurocerasus*



Fig. 4. Shifting cultivation area around village (May 30, 2007).

*arborea* (Blume) Iketani (Rosaceae). Along streams, there are small patches of the original evergreen forest that include *Saurauria nepaulensis* DC., *S. roxburghii* Wall. (Actinidiaceae), *Syzygium glabiflorum* (Duthie & Kurz) Bahadur & R.C.Gaur (Myrtaceae), *Ardisia polycephala* Wall. ex A.DC., *Maesa indica* (Roxb.) A.DC., and *M. membranacea* A.DC. (Primulaceae).

### Seasonally dry forests

At the foot of Natma Taung Saw is a very large town located beside the Saw river at an altitude of 450 m. Along the Saw river are stretches of rice paddies and fertile fields. Fabaceae is a common family found near the Saw river and includes species such as *Acacia catechu* (L.f.) Willd., *A. megaladena* Desv., *Albizia odoratissima* (L.f.) Benth., *Bauhinia racemosa* Lam., *Butea monosperma* (Lam.) Taub. (Fig. 5), *B. superba* Roxb. ex Willd., *Caesalpinia hymenocarpa* (Prain) Hattink, *Cassia fistula* L., *Dalbergia oliveri* Gamble ex Prain, *Millettia brandisiana* Kurz, *M. leucantha* Kurz var. *latifolia* (Dunn) P.K.Lôc, *Senna siamea* (Lam.) H.S.Irwin & Barneby.



Fig. 5. *Butea monosperma* (Lam.) Taub. (Mar. 2, 2007).

Slopes contain natural forests that are mainly composed of deciduous trees not disturbed by agriculture and that widespread up to 800 m in altitude. The south-facing slopes are dominated by *Dipterocarpus tuberculatus* Roxb. known as a dry dipterocarp forests (Indaing forests in Myanmar), mainly include *Buchanania lanzan* Spreng., *Gluta usitata* (Wall.) Ding Hou (Anacardiaceae), *Dalbergia volubilis* Roxb. (Fabaceae), *Ficus semicordata* Buch.-Ham. ex Sm. (Moraceae), and *Wendlandia tinctoria* DC. (Rubiaceae) (Fig. 6). Various bamboo species are also present at low to medium elevations, with *Tectona grandis* L. (Lamiaceae) plantations common at low elevations.

### Pine (*Pinus kesiya*) forests

The extensive and exclusive forests of *Pinus kesiya* Royle ex Gordon (Pinaceae) occur on dry ridges and south-facing slopes at 1800–2700 m of altitude (Fig. 7). At the edges and roadsides of the Pine forest, at around 1800–2400 m in elevation, grow *Alnus nepalensis*, *Nyssa javanica* (Blume) Wangerin (Cornaceae), *Vaccinium exaristatum* Kurz (Ericaceae), *Ostodes paniculata*

Blume (Euphorbiaceae), and *Toona sureni* (Blume) Merr. (Meliaceae). At slightly higher elevations, *Rhododendron arboreum* Sm. and *Lyonia ovalifolia* (Wall.) Drude (Ericaceae) become increasingly prominent.

On the forest floor, *Curcuma angustifolia* Roxb., *Globba wardii* (B.L.Burt & R.M.Sm.) K.J.Williams (Zingiberaceae) and *Indigofera dosua* Buch.-Ham. ex D.Don (Fabaceae) can be found due to the wide spacing of the trees, which allows light to reach the forest floor at altitudes of 1800–2400 m.

### Temperate broad-leaved forests

Species-rich temperate oak and/or laurel forests are also abundant around Natma Taung, except on dry or south-facing slopes and the ridges described above (Fig. 8). These forests are composed of tall and dense evergreen trees along with climbers and epiphytes. Fagaceae species belonging to the genus *Lithocarpus* and *Castanopsis*, as well as members of the Lauraceae such as *Lindera pulcherrima* (Nees) Hook.f., *Litsea doshia* (D. Don) Kosterm., *L. elongata* (Nees) Hook.f., *Machilus clarkeana* King ex Hook.f., and *Neolitsea foliosa* (Nees) Gamble were dominant in these forests along with *Euonymus theifolius* Wall. ex Lawson, *E. tingens* Wall. ex Roxb. (Celastraceae), *Cornus oblonga* (Cornaceae), *Rhamnus procumbens* Edgew. (Rhamnaceae), *Symplocos acuminata* (Blume) Miq., *S. ramosissima* Wall. ex G.Don and *S. theifolia* D.Don (Symplocaceae), which are found on the roadside above an altitude of 2300 m. Epiphytes such as *Coelogyne corymbosa* Lindl. (Orchidaceae) adorn the branches of these trees (Fig. 9), exploiting a niche amid the tough waxy oak leaves high up in the canopy. These dense crowns cast the forest floor in deep shade, making the sub-canopy and shrub layers somewhat thinner. On north and north-west slopes around the summit to Natma Taung at ca. 3000 m of altitude, evergreen trees and shrubs such as *Mahonia napaulensis* DC. (Berberidaceae), *Myrsine semiserrata* Wall. (Primulaceae), and *Daphne papyracea* Wall. ex G.Don (Thymelaeaceae) can be found.

On south-facing slopes and ridges, pine forests fade away with increasing elevation and are replaced with mixes of *Rhododendron arboreum* Sm. (Ericaceae) and *Quercus semecarpifolia*



Fig. 6. Dry dipterocarp forest (Feb. 13, 2007).



Fig. 7. Pine forest (May 30, 2007).



Fig. 8. Temperate broad-leaved forest (May 28, 2007).

Sm. (Fagaceae) beginning at around 2,700 m in altitude. Continuing up toward the summit of Natma Taung, forest stature drops to 6–7 m and the trees become more widely spaced (Fig. 10). In open scattered forests along the trekking path to the summit, such shrub species as *Rhododendron burmanicum* Hutch. (Ericaceae), *Piptanthus nepalensis* (Hook.) Sweet (Fabaceae), *Rosa sericea* Lindl., *Cotoneaster microphyllus* Wall. ex Lindl. (Rosaceae), and *Leptodermis griffithii* Hook. f. (Rubiaceae), *Symplocos phyllocalyx* C.B. Clarke (Symplocaceae) can be observed.

### Montane meadow

The summit of Natma Taung is covered with an open meadow created by wind exposure that resembles an alpine meadow (Fig. 11). This meadow produces spectacularly colorful displays of *Primula denticulata* Sm. (Primulaceae) in Feb-Mar., *Anemone obtusiloba* D. Don (Ranunculaceae) in May-July, *Iris decora* Wall. (Iridaceae) in May-July, *Allium wallichii* Kunth (Amaryllidaceae) in July-Dec., *Gentiana cephalantha* Franch. (Gentianaceae) in Oct.-Dec., and *Anaphalis busua* (Buch.-Ham.) DC. (Asteraceae) in Nov.-Jan. These plants bloom one after another all year round in the meadow. In addition, *Swertia burmanica* Harry Sm. (Gentianaceae), *Potentilla montisvictoriae* H. Ikeda & H. Ohba (Rosaceae), *Roscoea australis* Cowley (Zingiberaceae), and *Jurinea natmataungensis* (Fujikawa) Fujikawa (Asteraceae) are endemic species that can be found on Natma Taung National Park and the surrounding area.



Fig. 9. *Coelogyne corymbosa* Lindl. (May 28, 2007).



Fig. 10. *Rhododendron* & *Quercus* scattered forest (May 26, 2012).



Fig. 11. Montane meadow at the summit of Natma Taung (May 28, 2007).

## Acknowledgements

We express our cordial thanks to Dr. Nyi Nyi Kyaw, Director General of the Forest Department, Mr. Win Naing Taw, ex-Director, and Dr. Naing Zaw Htun, Director of the Nature and Wildlife Conservation Division, Forest Department, Myanmar, and Dr. Tetsuo Koyama, ex-Director General of the Kochi Prefectural Makino Botanical Garden, Japan, for their continued enthusiasm and support of field expeditions. Special thanks are also due to the rangers of Natma Taung National Park for their kind help during field surveys.

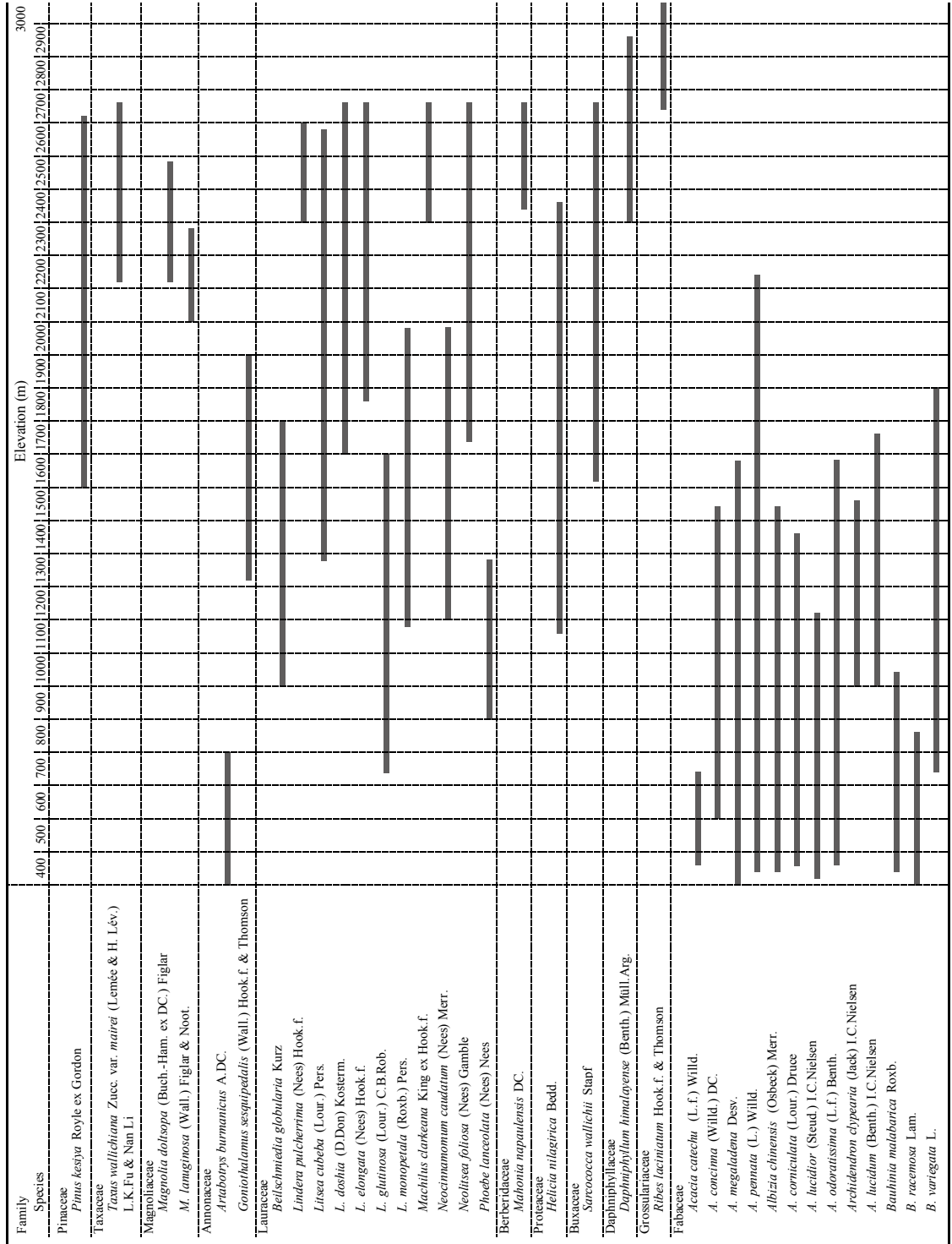


This article summarized previous reports on forests of Natma Taung by Fujikawa et al. (2008, 2012, 2014 & 2015).

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Appendix I. Altitudinal ranges of main trees and shrubs in Natma Taung National Park based on herbarium specimens' data.



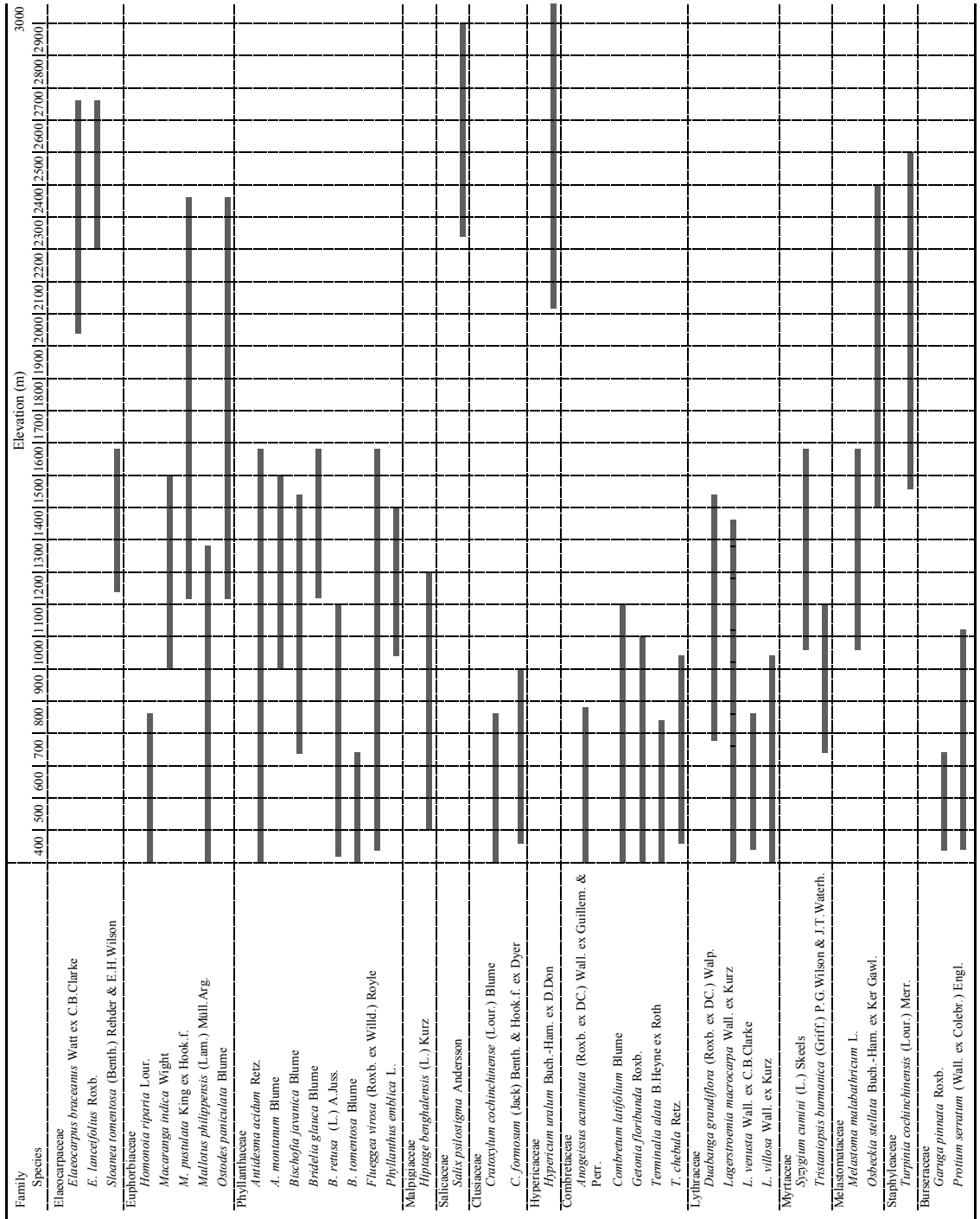
Appendix I. Continuation.

Family	Species	Elevation (m)
Fabaceae	<i>Butea monosperma</i> (Lam.) Taub.	400-500
	<i>B. superba</i> Roxb. ex Willd.	400-500
	<i>Caesalpinia hymenocarpa</i> (Prain) Hartink	400-500
	<i>C. pulcherrima</i> (L.) Sw.	400-500
	<i>C. sappan</i> L.	400-500
	<i>Cassia fistula</i> L.	400-500
	<i>Dalbergia cana</i> Graham ex Kurz	400-500
	<i>D. cultrata</i> Benth.	400-500
	<i>D. obtusifolia</i> (Baker) Prain	400-500
	<i>D. oliveri</i> Gamble ex Prain	400-500
	<i>D. ovata</i> Graham ex Benth.	400-500
	<i>D. rimosa</i> Roxb. var. <i>foliacea</i> (Benth.) Thoth.	400-500
	<i>Entada rheederi</i> Spreng.	400-500
	<i>Epythrina stricta</i> Roxb.	400-500
	<i>E. suberosa</i> Roxb.	400-500
	<i>Millettia brandisiana</i> Kurz	400-500
	<i>M. extensa</i> (Benth.) Baker	400-500
	<i>M. leucantha</i> Kurz var. <i>latifolia</i> (Dunn) P.K.Lôc	400-500
	<i>Piptanthus nepalensis</i> (Hook.) Sweet	400-500
	<i>Pterocarpus macrocarpus</i> Kurz	400-500
	<i>Senna siamea</i> (Lam.) H.S.Irwin & Barneby	400-500
	<i>Xylocarpus xylocarpus</i> (Roxb.) Taub.	400-500
	Rosaceae	
	<i>Aria corymbifera</i> (Miq.) H.Ohashi & Iketani	400-500
	<i>A. verticosa</i> (Deene.) Iketani	400-500
	<i>Cerasus cerasoides</i> (Buch.-Ham. ex D.Don) S. Ya.Sokolov	400-500
	<i>Colomeaster microphyllus</i> Wall. ex Lindl.	400-500
	<i>Diospya indica</i> (Wall.) Decne.	400-500
	<i>Eriobotrya bengalensis</i> (Roxb.) Hook.f.	400-500
	<i>E. glabrescens</i> J.E.Vidal var. <i>vietnamiensis</i> J.E.Vidal	400-500
	<i>Laurocerasus arborea</i> (Blume) Iketani	400-500
	<i>L. undulata</i> (Buch.-Ham. ex D.Don) M.Roem.	400-500
	<i>Padus cornuta</i> (Wall. ex Royle) Carrière	400-500
	<i>P. integrifolia</i> T.T.Yu & T.C.Ku	400-500
	<i>Photinia integrifolia</i> Lindl.	400-500
	<i>Rosa longicauspis</i> Bertol.	400-500
	<i>R. sericea</i> Lindl.	400-500
	<i>Rubus biflorus</i> Buch.-Ham. ex Sm.	400-500
	<i>R. ellipticus</i> Sm.	400-500
	<i>R. pedunculatus</i> D.Don	400-500
	<i>Sorbus vernucosa</i> (Deane.) Rehder	400-500
	<i>Spraea bella</i> Sims.	400-500

## Appendix I. Continuation.

Family	Species	Elevation (m)
Elaeagnaceae	<i>Elaeagnus griffithii</i> Severt.	1100-1200
Rhamnaceae	<i>Rhamnus napalensis</i> (Wall.) M.A. Lawson	1500-1600
	<i>R. procumbens</i> Edgew.	1500-1600
	<i>Ventilago calycalata</i> Tul.	1500-1600
	<i>Ziziphus incarna</i> Roxb.	1500-1600
	<i>Z. mauritiana</i> Lam.	1500-1600
	<i>Z. oenopolia</i> (L.) Mill.	1500-1600
	<i>Z. rugosa</i> Lam.	1500-1600
Moraceae	<i>Artocarpus lacucha</i> Buch.-Ham.	600-700
	<i>Ficus auriculata</i> Lour.	600-700
	<i>F. hederacea</i> Roxb.	600-700
	<i>F. nerifolia</i> Sm.	600-700
	<i>F. semicordata</i> Buch.-Ham. ex Sm.	600-700
	<i>F. subincisa</i> Buch.-Ham. ex Sm.	600-700
Urticaceae	<i>Debregeasia longifolia</i> (Burm.f.) Wedd.	1500-1600
Fagaceae	<i>Castanopsis learyi</i> Hickel & A. Camus	1500-1600
	<i>C. tribuloides</i> (Sm.) A. DC.	1500-1600
	<i>Lithocarpus dealbanus</i> (Hook.f. & Thomson ex Miq.) Rehder	1500-1600
	<i>L. elegans</i> (Blume) Hatus ex Soepadmo	1500-1600
	<i>L. fenestratus</i> (Roxb.) Rehder	1500-1600
	<i>L. lindleyanus</i> (Wall. ex A. DC.) A. Camus	1500-1600
	<i>L. truncatus</i> (King ex Hook.f.) Rehder & E.H. Wilson	1500-1600
	<i>L. xylocarpus</i> (Kurz) Markgr.	1500-1600
	<i>Quercus aliena</i> Blume ssp. <i>griffithii</i> (Hook.f. & Thomson ex Miq.) Phengklai	1500-1600
	<i>Q. heiferiana</i> A. DC.	1500-1600
	<i>Q. lanata</i> Sm.	1500-1600
	<i>Q. semecarpifolia</i> Sm.	1500-1600
Myricaceae	<i>Myrica esculenta</i> Buch.-Ham. ex D. Don	1500-1600
Juglandaceae	<i>Engelhardtia spicata</i> Blume	1500-1600
Betulaceae	<i>Alnus napalensis</i> D. Don	1500-1600
	<i>Betula alnoioides</i> Buch.-Ham. ex D. Don	1500-1600
Celastraceae	<i>Celastrus monospermus</i> Roxb.	1500-1600
	<i>C. paniculatus</i> Willd.	1500-1600
	<i>C. stylosus</i> Wall.	1500-1600
	<i>Euonymus frigidus</i> Wall. ex Roxb.	1500-1600
	<i>E. theifolius</i> Wall. ex M.A. Lawson	1500-1600
	<i>E. tingars</i> Wall. ex Roxb.	1500-1600
	<i>Gymnosporia hookeri</i> (Loes.) Loes.	1500-1600

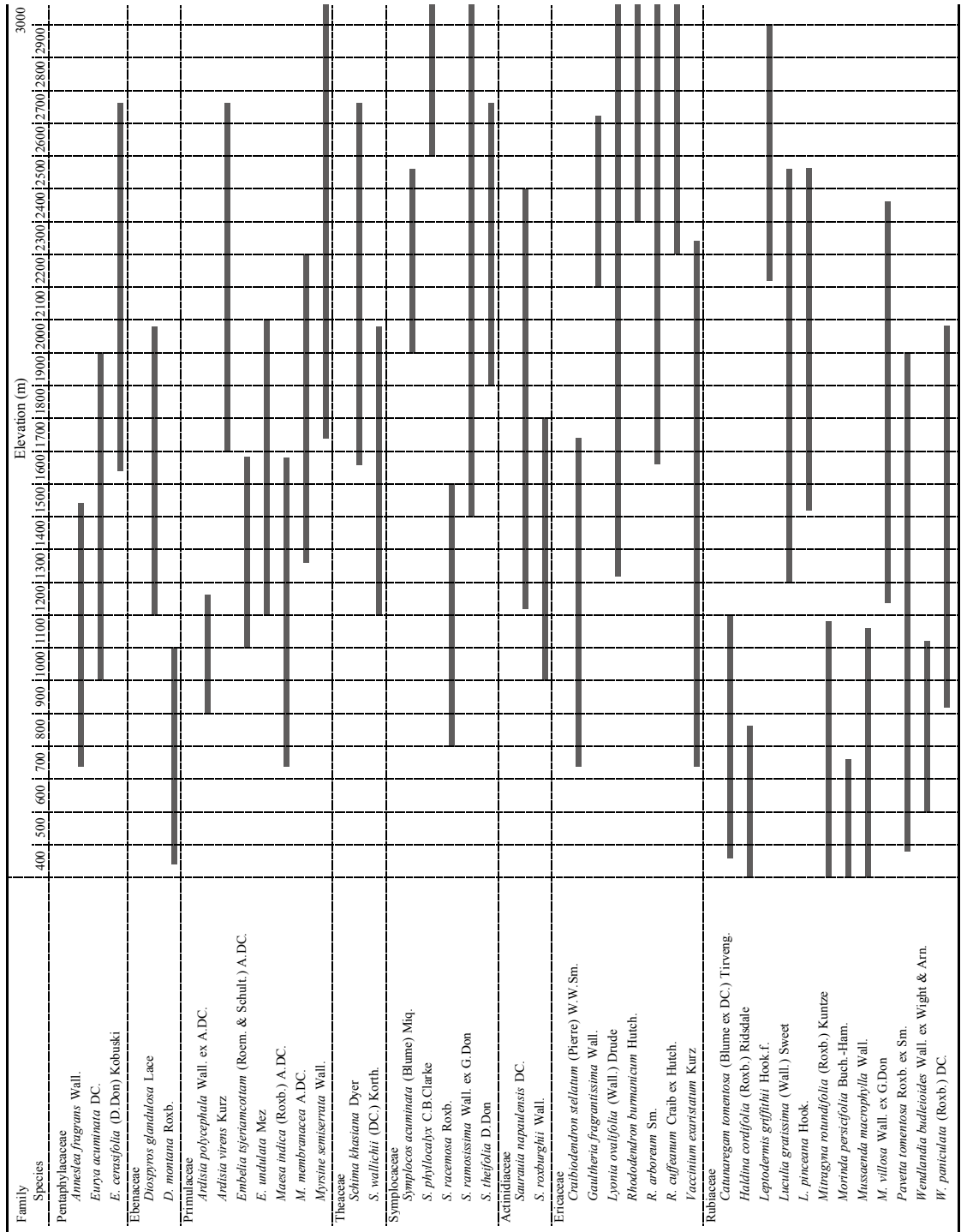
Appendix I. Continuation.



Appendix I. Continuation.

Family	Species	Elevation (m)
Anacardiaceae	<i>Bichanania lanzan</i> Spreng.	400-1100
	<i>Gluta usitata</i> (Wall.) Ding Hou	400-1100
	<i>Lannea coromandelica</i> (Houtt.) Merr.	400-1100
	<i>Rhus chinensis</i> Mill.	400-1100
	<i>Somnecarpus subracemosus</i> Kurz	400-1100
	<i>Spondias pinnata</i> (L.f.) Kurz	400-1100
	<i>Toxicodendron velliichii</i> (Hook.f.) Kuntze	400-1100
Sapindaceae	<i>Acer campbellii</i> Hook.f. & Thomson ex Hiern	400-1100
	<i>A. oblongum</i> Wall. ex DC.	400-1100
	<i>Allophylus cobbe</i> (L.) Raeusch.	400-1100
Rutaceae	<i>Harrisonia perforata</i> (Blanco) Merr.	400-1100
	<i>Murraya paniculata</i> (L.) Jack	400-1100
	<i>Tetradium fraxinifolium</i> (Hook.f.) T.G.Hartley	400-1100
	<i>Toddalia asiatica</i> (L.) Lam.	400-1100
	<i>Zanthoxylum acanthopodium</i> DC.	400-1100
	<i>Z. scandens</i> Blume	400-1100
Meliaceae	<i>Heynea trijuga</i> Roxb. ex Sims	400-1100
	<i>Melia azedarach</i> L.	400-1100
	<i>Toona sureni</i> (Blume) Merr.	400-1100
Malvaceae	<i>Colona floribunda</i> (Kurz) Craib	400-1100
	<i>Eriolaena camdollei</i> Wall.	400-1100
	<i>Firmiana colorata</i> (Roxb.) R.Br.	400-1100
	<i>Grewia entocarpa</i> Juss.	400-1100
	<i>G. hirsta</i> Vahl	400-1100
	<i>G. laevigata</i> Vahl	400-1100
	<i>G. sclerophylla</i> Roxb. ex G.Don	400-1100
	<i>Kydia calycina</i> Roxb.	400-1100
	<i>Pteropemum semisagittatum</i> Buch.-Ham. ex Roxb.	400-1100
Thymelaeaceae	<i>Daphne papyracea</i> Wall. ex G.Don	400-1100
Dipentocarpaceae	<i>Dipentocarpus tuberculatus</i> Roxb.	400-1100
	<i>Shorea obtusa</i> Wall. ex Blume	400-1100
	<i>S. siamensis</i> Miq.	400-1100
Oleaceae	<i>Schoepfia fragrans</i> Wall.	400-1100
Coniaceae	<i>Comus capitata</i> Wall.	400-1100
	<i>C. oblonga</i> Wall.	400-1100
	<i>Nyssa javanica</i> (Blume) Wangerin	400-1100
Hydrangeaceae	<i>Philadelphus delavayi</i> L. Henry	400-1100

Appendix I. Continuation.



## Appendix I. Continuation.

Family	Species	Elevation (m)
Loganiaceae	<i>Strychnos nux-blanda</i> A.W.Hill	400   500   600   700   800   900   1000   1100   1200   1300   1400   1500   1600   1700   1800   1900   2000   2100   2200   2300   2400   2500   2600   2700   2800   2900   3000
Apocynaceae	<i>Astonia scholaris</i> (L.) R.Br. <i>Wrightia arborea</i> (Dennis) Mabb.	400   500   600   700   800   900   1000   1100   1200   1300   1400   1500   1600   1700   1800   1900   2000   2100   2200   2300   2400   2500   2600   2700   2800   2900   3000
Oleaceae	<i>Jasminum dispersum</i> Wall. <i>J. dispersum</i> Wall. ssp. <i>forrestianum</i> (Kobuski) P. S. Green	400   500   600   700   800   900   1000   1100   1200   1300   1400   1500   1600   1700   1800   1900   2000   2100   2200   2300   2400   2500   2600   2700   2800   2900   3000
Scrophulariaceae	<i>Buddleia asiatica</i> Lour. <i>B. macrostachya</i> Wall. ex Benth. <i>B. paniculata</i> Wall.	400   500   600   700   800   900   1000   1100   1200   1300   1400   1500   1600   1700   1800   1900   2000   2100   2200   2300   2400   2500   2600   2700   2800   2900   3000
Lamiaceae	<i>Callicarpa arborea</i> Roxb. <i>Gmelina arborea</i> Roxb. ex Sm. <i>Tectona grandis</i> L.f. <i>Vitex burmensis</i> Moldenke <i>V. quinata</i> F. N. Williams	400   500   600   700   800   900   1000   1100   1200   1300   1400   1500   1600   1700   1800   1900   2000   2100   2200   2300   2400   2500   2600   2700   2800   2900   3000
Biognoniaceae	<i>Fernandoa adenophylla</i> (Wall. ex G. Don) Steenis <i>Stereospermum tetragonum</i> DC.	400   500   600   700   800   900   1000   1100   1200   1300   1400   1500   1600   1700   1800   1900   2000   2100   2200   2300   2400   2500   2600   2700   2800   2900   3000
Aquifoliaceae	<i>Ilex dipryena</i> Wall.	400   500   600   700   800   900   1000   1100   1200   1300   1400   1500   1600   1700   1800   1900   2000   2100   2200   2300   2400   2500   2600   2700   2800   2900   3000
Asteraceae	<i>Monosium volkammerifolia</i> (DC.) H. Rob. & Skvarla	400   500   600   700   800   900   1000   1100   1200   1300   1400   1500   1600   1700   1800   1900   2000   2100   2200   2300   2400   2500   2600   2700   2800   2900   3000
Viburnaceae	<i>Viburnum atrocyaneum</i> C.B. Clarke <i>V. cylindricum</i> Buch.-Ham. ex D. Don <i>V. erubescens</i> Wall.	400   500   600   700   800   900   1000   1100   1200   1300   1400   1500   1600   1700   1800   1900   2000   2100   2200   2300   2400   2500   2600   2700   2800   2900   3000
Caprifoliaceae	<i>Leycesteria formosa</i> Wall.	400   500   600   700   800   900   1000   1100   1200   1300   1400   1500   1600   1700   1800   1900   2000   2100   2200   2300   2400   2500   2600   2700   2800   2900   3000
Pitroporaceae	<i>Pitroporum napaulense</i> (DC.) Rehder & E.H. Wilson	400   500   600   700   800   900   1000   1100   1200   1300   1400   1500   1600   1700   1800   1900   2000   2100   2200   2300   2400   2500   2600   2700   2800   2900   3000
Analiaceae	<i>Aralia leschenaultii</i> (DC.) J. Wen <i>Brassiopsis mitis</i> C.B. Clarke <i>Macropanax dispersum</i> (Blume) Kuntze <i>Schefflera elliptica</i> (Blume) Harms <i>S. hypoleuca</i> (Kurz) Harms	400   500   600   700   800   900   1000   1100   1200   1300   1400   1500   1600   1700   1800   1900   2000   2100   2200   2300   2400   2500   2600   2700   2800   2900   3000



# Water Environment and Land Use in Natma Taung National Park

Takeshi Fujino

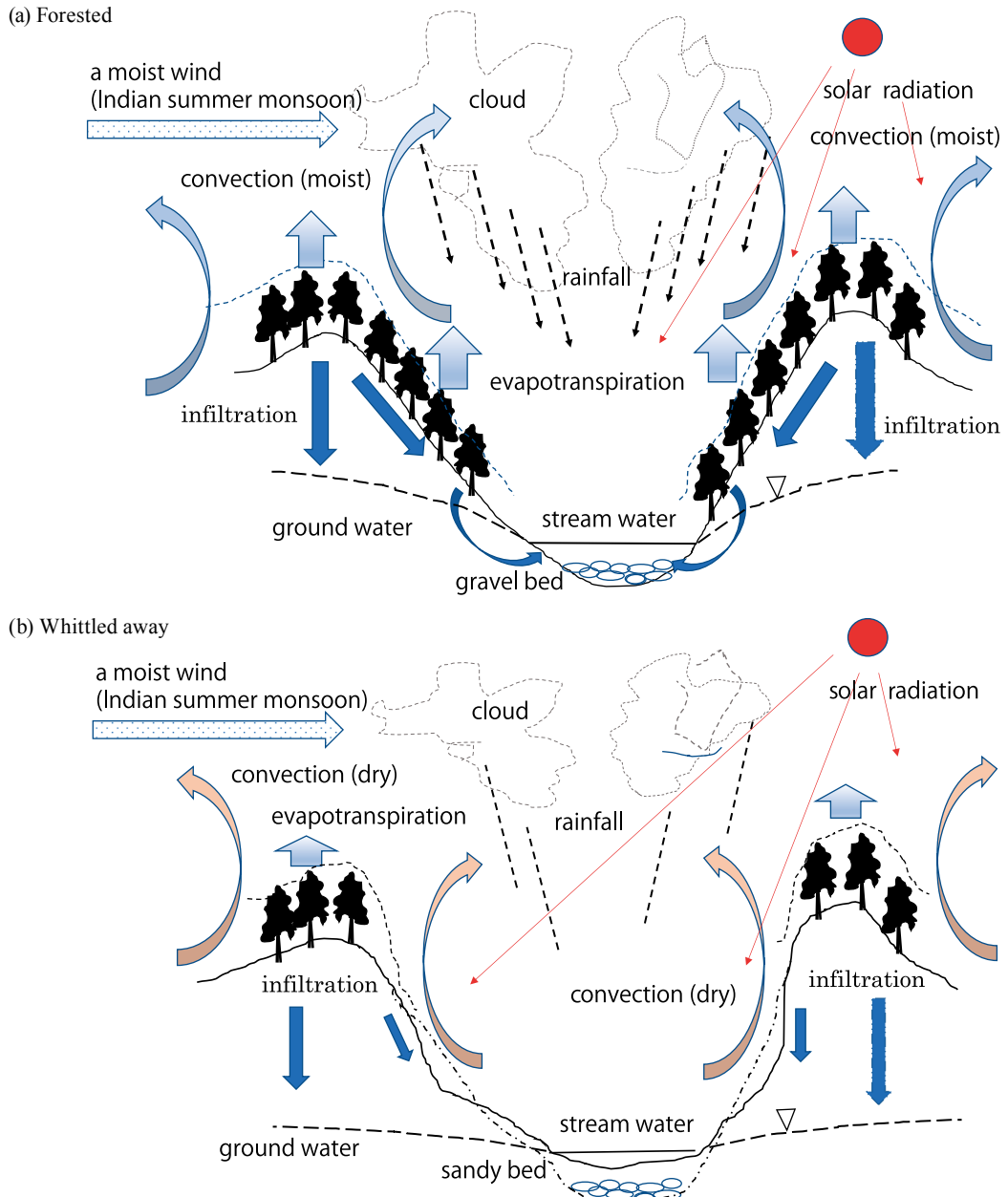
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## Rainfall and hydrological cycle

Although there is a brief risk of water shortage in the Ayeyarwady river basin every February, data collected between 1996 and 2005 indicate that water is otherwise stable throughout the year (Hoekstra & Mekonnen 2011). Over the long term, however, the flow volume of the basin shows a significant declining trend when compared to records from the 1870s (Furuuchi et al. 2009). Past rainfall data for the Southern Chin State has never been recorded, but the annual rainfall for Falam and Hakha in Northern Chin State is 1,457 mm and 1,811 mm, respectively (MNPED 2010). In addition, the annual rainfall in the western part of the State reaches 4,000–6,000 mm due to the Indian summer monsoons (FAO 2015). In Mindat, the wet season starts in April and continues until October (Weather Outlook 2015). As a consequence, the water retaining function of forests is important for preserving water resources during the dry season. Indeed, reduction in forest cover due to slash-and-burn agriculture during the 1990s and early 2000s has been a concern for maintaining both water quality and quantity (Fujino et al. 2013). However, minimal deforestation occurred in the Chin State between 2001 and 2010 (0.28%), and currently, it is the most protected region in Myanmar (Wang & Myint 2016).

The Natma Taung National Park contains extensive broad-leaved forests, and evapotranspiration from these forests plays an important role in the regional water budget. Due to its steep topography, the regional water cycle is easy to establish and measure (Fig. 1). Theoretically, approximately 40% of rainfall in forested areas cycles back into the atmosphere as evapotranspiration, 25% is transferred to the shallow and deep soil layers as infiltration, while 10% is discharged to river catchments (Allan & Castillo 2007). Therefore, when forests are destroyed through slash-and-burn agriculture, transpiration rates decrease and discharge and infiltration rates into the catchments increase substantially. Over the long term, decreasing evapotranspiration contributes to declining rainfall, which in turn affects the quantity of water retained in the system, eventually resulting in decreasing river flows. On the other hand, sudden heavy rainfall can cause landslides in such steep topography. For example, in August 2015, western Myanmar experienced the largest rainfall event ever recorded, causing widespread damage and landslides throughout the region, including the Chin State.

Appropriate forest management can help to mitigate the effects of such disasters, especially from unpredictable weather patterns that are expected to increase due to climate change, such as irregular rainfall and storm events. However, the poorly planned widening of arterial roads and mountain track linking of Mindat to the Magway Region have impacted entire slope faces, exacerbating the effects of heavy rainfall, and leading to an increased likelihood of landslides. The effects of these projects also have had a major effect on biodiversity in the region.



### Water quality and river environment

The Chee river catchment provides high quality water to local people and communities, with an annual water temperature between 12 and 26°C at 735 m altitude near Mindat (Fig. 2). The diurnal range of the surface water temperature is 3–5°C (Fig. 3). The water chemistry (pH) and electric conductivity (EC) are stable throughout the year, with pH ranging between 7.5–8.0 and

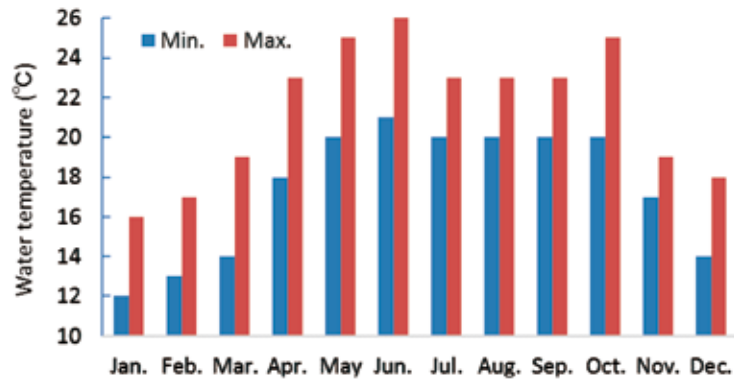


Fig. 2 Annual Chee river water temperature in 2013.

Table 1. Electric components and hardness of streams and rainwater in 2014.

	Chee-C Mindat	Chee-C Magway	Saw-C Kampetlet	Rainfall Kampetlet
Na, mg/L	9.5	10.9	4.5	1.1
NH <sub>4</sub> , mg/L	0.0	0.0	0.0	0.0
K, mg/L	0.7	1.0	0.1	0.6
Mg, mg/L	6.2	6.9	3.4	0.2
Ca, mg/L	38.6	45.1	37.2	1.2
Hardness, mg/L	122	141	107	4

At pH 7.5-8.0

EC varying between 0.1 and 0.2 mS/cm. Dissolved calcium (38 mg/L) and magnesium ions (6.2 mg/L) are in the middle of the hardness range, according to WHO guidelines. The EC of the rainwater at Kanpetlet was 0.032 mS/cm, indicating that there is much less aerial pollution there than in urban areas (Table 1). Nevertheless, alterations to the riverscape (see below) have been confirmed from recent observations.



Fig. 3. Chee river before excessive precipitation in August 2015, Mindat (Feb. 7, 2015).

### Planarization of the riverbed;

Due to annual large-scale heavy rainfall in recent years, the shape of the Chee river has been altered, and the gap in the riverbed has been filled by fine soil, which has been transferred to the catchment from the surrounding mountain slopes. In the hot season between April and May, filamentous algae grow in areas of slow current along the riverside. Nutrients supplied from slash-and-burn agriculture are inferred (Figs. 4 & 5).

Pollution from organic substances is induced, and the microhabitats of various benthic invertebrates are affected or destroyed. Overall, diversity in the aquatic biota is reduced, which in turn contributes to a decrease in predatory fish species.



Fig. 4. Chee river after excessive precipitation in August 2015, Mindat (Nov. 26, 2015).



Fig. 5. Vagrant filamentous algae on Chee river bed, Mindat (May 15, 2016).

### **Hydropower construction without environmental impact assessments**

The construction of a dam for hydropower began in 2014 on the Saw river near Kanpetlet, but no environmental impact assessment was completed prior to beginning production. In addition, baseline investigations of the flow regime and sediment transport have not been conducted. Subsequently, construction was suspended due to a large-scale flood in August 2015. Due to the steep topography in the catchment and deforestation, it appears that infilling the dam is inevitable. Moreover, crude construction techniques and poor development planning have led us to conclude that the dam footprint likely will have considerable environmental impacts (Fig. 6) .



Fig. 6. Hydropower dam construction at Saw river (Mar. 4, 2014).

### **No scientific information for water supply source**

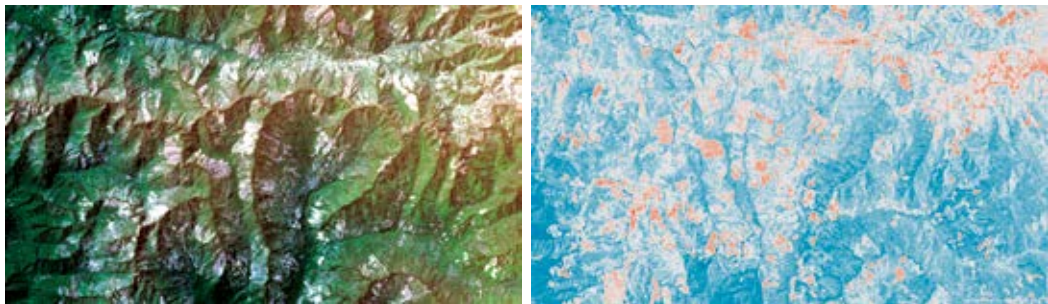
The first water supply system in Mindat was constructed in the 1970s, and it is located far from the center of the village. Tap water must be transported by narrow plastic pipes. Access to the source is very difficult, as only the ranger can monitor the station. Since 2012, UNICEF constructed water supply systems in other remote areas in Natma Taung. However, there is no scientific information about water quality. The local government should recognize the importance of the water supply source and take advantage of scientific input regarding conservation (Fig. 7) .

### **Land use in the Chee river catchment**

Satellite images and normalized difference vegetation index (NDVI) maps of the Chee river catchment from February 1993 to January, 2017 show a transition in land use (Figs. 8a-f). Until 2005, areas of slash-and-burn agriculture were distributed widely along the main channel and branches of the Chee river. Within 1 km of the channels, about half of the slash-and-burn agriculture could be located. As a result, nutrient rich soil was transferred into the river during the rainy season (Fujino et al. 2013). After 2009, the burned area was significantly reduced and

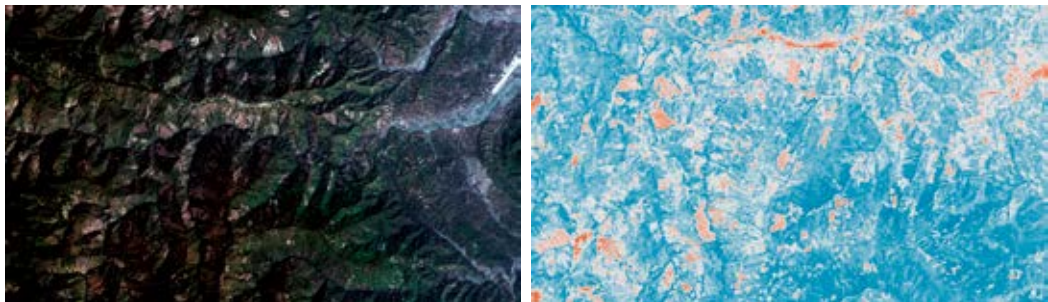


Fig. 7. The first water supply systems in Mindat (April. 17, 2017).



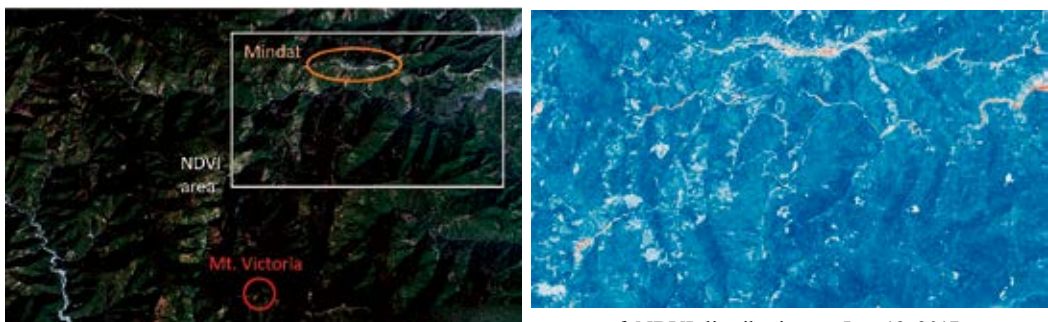
a. True color image on Feb. 27, 1993.

b. NDVI distribution on Feb. 27, 1993.



c. True color image on Jan. 27, 2005.

d. NDVI distribution on Jan. 27, 2005.



e. True color image on Jan. 2016 with showing object region of Satellite image data.

f. NDVI distribution on Jan. 19, 2017.  
Color: negatives, green: positives.

Fig. 8. Landsat TM true color image and NDVI distribution for Chee river catchment.

the very low NDVI areas were limited to residential areas. On the other hand, the arterial roads and mountain tracks were clearly recognized in 2017 and were the result of increased road widening. Previous studies have shown that high nitrogen and phosphorus concentrations were observed for a few weeks after the forests were burned. The concentrations decreased at sites of steep topography but persisted for 3–5 years in sites with more gentle topography (Hauer & Spencer 1998). In the case of the Chee river catchment, a change in the river water quality becomes more apparent after May, when the wet season begins. The duration of this change in water quality is not known, because rainfall intensity has not been estimated. However, if farmers start applying chemical fertilizers to increase production of crops, then proper management to mitigate the effects on water quality and minimize pollution will be required (Fig. 9).



Fig. 9. Slope face of arterial road (right) and mountain track (left) linking Mindat to the Magway Region and to the Victoria mountain (Apr. 7, 2016).

### **The comprehensive management of water and land**

To preserve natural forests in the upstream region of Natma Taung, it is important to extend the fallow period and control the heavy use of fertilizers for slash-and-burn agriculture. This will have important consequences in the downstream Magway Region, which is the grain belt for the people of Chin and Magway. The Chin tribes are in the process of transitioning to an increasingly modern lifestyle, and comprehensive water and land management plans are required in Natma Taung for sustainable development in the region. Tourism is likely to be an important part of the local economy in the future, and promotion of ecotourism is surely an important step in the direction of sustainable development.

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## Chins: People, Society, and Culture

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The Union of Myanmar is a multi-ethnic country which includes 135 official ethnic groups. The Burmese constitute the majority group and account for around 75% of the entire population of Myanmar (50 million people). The Burmese mainly live in the plains of the Ayeyawaddy river Basin, which is administratively divided into seven Regions. The minority groups mostly live in the mountainous peripheral areas surrounding the plains. These areas are divided into seven States that are named after the main local ethnic group. Some of the minority groups historically existed as a type of political and social unit, such as the Rakhine (Yakhine), Mon, Kayah, and Shan, although the latter was divided into several chiefdoms. The Karen (Kayin), Kachin, and Chin have never existed as united groups and have been culturally and socially divided into many sub-groups.

The Chin languages belonging to the Tibet-Burman linguistic sub-group to the Kuki-Chin group of the Burma section. The term has been coined by others, but the Chin do not use a single name for themselves. The word “Chin” is derived from Khyang or Khalang and means friend. The term has been historically recorded since the 13th century. Many Chin groups use the word, which is a variant of “zo” or “yo,” which mean uncivilized, in contrast to the word “Burmese”, which means civilized.

The Chin people inhabit the mountainous areas of western Myanmar in the border area with India. The Chin encompass many groups. Traditionally, each group is a separate social and political unit and has its own language and culture. According to a Chin legend, their place of origin is the source of many rivers, some of which flow through the continental southeast, perhaps in the Kan-Su province of China. They scattered because of aggressive attacks by the Chinese. Some of them moved down the water stream of Chindwin and Ayeyawaddy, and the ancestral people of Chin settled down in the basin of Chindwin from about the middle of the first millennium A.D. In the same group as the Chin people, there are other groups belonging to the Tibet-Burman languages (i.e., the Thet, Naga, and Kachin), but there is no conclusive evidence on whether the ancestors of these people existed as subsistence and emigrated together.

This story is a type of myth. Historically, from the 14th to the 19th centuries, people dwelling in the plain areas of the riversides of Chindwin moved westward into the mountainous areas of Chin Hill due to fighting between the Burmese and Shans and between the Burmese and Manipuri. As well the Chin people were often raided by other people. By the way, Manipur was the Hinduized state in the valley of Manipur in Northeast India. The Meithei, the dominant group of this kingdom, is one type of Chin people that possibly separated from the emigration of other Chins and entered India. They are historically the only “civilized” people among the Chin.

Most Chin people living in hilly terrains have traditionally run subsistence economies based on slash-and-burn agriculture. They use this technique to get manure with salt that wild animals come to lick and believe that mature males should hunt the animals. Some groups sacrifice poultry, pigs, and other animals and apply the blood of sacrificed animals on seeds to attract good harvests. The Chin share a variety of customs to worship traditional spirits, as well as methods to burn, cultivate, and sow.

The Chin society practices a division of labor between men and women. Men cultivate fields, build houses, make baskets and mattresses, hunt, and defend the village. Women cook food, pound and winnow rice, and fetch water and firewood. Every Chin woman is able to weave. On the other hand, it is important for every Chin man to hunt.

As for kinship relations within Chin people, descent is patrilineal and they have patrilineages. This custom is similar to those of other mountainous people such as the Kachin but differs from those of plain people like the Burmese, where kinship relations are bilateral. At the time of marriage, a Chin woman enters into the kinship group of her husband. Most Chin groups from the hills prefer marriages with the real or classificatory daughter of the mother's brother. In some Chins, the kin group which provides the bride and that which provides the bridegroom are fixed. Through marriage, wealth and human resources are exchanged, and social and economic equilibrium is maintained in the whole community. Among hill Chins, in some places, inheritance is by primo geniture (inheritance by eldest child) and, in other places, by ultimo geniture (inheritance by youngest child), but combinations of both are also found.

In southern Chin people, formal political institutions at the village level are largely absent, whereas in some northern Chin people, villages are led by a chief or village headman or are governed by a village council. Some chiefs are descendants of the first people who settled in the land of village. In the north, kin groups are stratified into aristocrats and commoners. In the south, each household achieves differential status by the performance of 'feasts of merit' (feast held at the occasion of achieving).

For Chin people, *mithun* (gayal) cattle are the most valuable animals. Chin people measure an individual's wealth and honor by the number of *mithun* he has, and entertaining guests by killing *mithuns* at ceremonial occasions (e.g., rites of passage) brings great honor. If a man hunts or kills many animals, it is deemed that he would possess many animals in the next world. When a man kills an animal, especially in the case of big game, he holds a feast with drinking and dancing and invites other villagers to sacrifice domestic animals. In addition, the Chin people think hornbills are happy birds, and if a person shoots this bird dead, he holds a feast. The hornbill is a symbol of the Chin male and is depicted on the flag of the Chin State. If a person does not hunt any game, he would fall into hell or would receive a punishment in the next world. Skulls of animals that were hunted or sacrificed are hung along with weapons on the outer walls of Chin houses. Villagers thereby witness the influence and authority of owner of the house. Good hunters are respected in Chin society, and in some places, these people would be appointed or elected as leaders or officials of the village.

Chin people believe in the afterlife. The soul of a deceased person will go to a village of the dead, and at the entrance of that village, the person will receive a trial. Men who failed in hunting and women who could not weave are usually punished. In some Chin people, admission to heaven is based on achievements in feasts of merit during the deceased's lifetime. The differential social status achieved in this world would be prolonged in the afterlife. The Buddhist Burmese make merits to wish for a better life in the next world. They donate or give alms to Buddha, monks, and laypeople and practice religious duties and meditate. They accumulate merits that determine their destiny in the next life. At ceremonial occasions such as rites of passage, the Buddhist Burmese hold feasts to entertain villagers and friends by offering meals with meat. This performance enhances the influence and authority of the host and creates merits for the next life.

Although the economy, social system, and culture of Chin people differ from those of the plain people, who are mostly Burmese, some aspects are common to both people. To understand the history and ethnic relationships of Myanmar, it is important to study and understand the culture of Chin people and compare it with that of Burmese people and other ethnic groups.

# Life in Natma Taung National Park

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In recent years, Myanmar has opened up greatly to the outer world both politically and economically; most notably welcoming the establishment of a new government led by Aung San Suu Kyi in early 2016. Various aspects of daily life in Myanmar have changed hugely as a consequence. Economic changes have germinated in larger cities like Yangon, where they have accelerated most dramatically. But even in remote rural areas like Natma Taung in Southern Chin State, lives are changing so rapidly that just a few years into the future the information reported here may be a relic of the past. The unique agricultural and hunting traditions, so necessary to the livelihoods of indigenous communities of Chin State through centuries, may go the same way of many other such native civilizations and become mere tourist attractions.

As part of a project conducted by the Kochi Prefectural Makino Botanical Garden (MBK), Forest Department (FD) and Japan International Cooperation Agency (JICA), the author spent two years (May 2007 to May 2009) as a resident manager living and working together with the townspeople of Kanpetlet. Experiences accumulated during this stay was reported in FD/JICA/MBK project report issued in 2012. As the author continued his annual visit to the area until 2019, some revisions based on additional findings have been made here in this article.

## About Natma Taung

Located at the western end of Myanmar and sharing a border with Bangladesh, Chin State comprises 9 townships. The southernmost, Kanpetlet, is home to a population of 21,493 (surveyed in 2014) including 53 ethnic groups in 127 villages (Fig. 1).

Until just a few years ago, tourists from foreign countries visiting Natma Taung (formerly named Mt. Victoria) for birdwatching or to observe traditional cultures were required to obtain advance written permission from governmental authorities. Even today, tourists must present their passport details to the town's immigration office upon arrival. A tough day's journey in a jeep over rough roads is still necessary to reach Kanpetlet.

Since Natma Taung is located at high mountainous altitudes of 1300–3000 m above sea level, the use of vehicles between the center of Kanpetlet (population of 4,159; surveyed in 2014) and its peripheral villages is highly limited. Motorcycles can be used to access about a hundred villages, but the remainder still demand numerous hours of walking through narrow mountain passes with



Fig. 1. Bird's eye view of Kanpetlet (June 2007).

some distant villages taking over two days to reach.

To understand life in Natma Taung, one must realize that large disparities in lifestyles exist between the inhabitants of central Kanpetlet and those in the surrounding villages. The former usually work in local government offices, small provision shops and businesses, regional transport of goods, and so on. Daily necessities and groceries are purchased with cash and their lives are closely connected to the monetary systems in place. On the other hand, people in neighboring villages rely largely on shifting cultivation and hunting for sustenance. Apart from selling firewood and other goods, which they carry on foot to Kanpetlet, for money to exchange for daily necessities such as rice, salt, medicine and other items, which they take back to their villages, money is rarely used there. Due to the poor accessibility of these villages, age-old customs and lifestyles of the Southern Chin can still be observed.

### Slash-and-burn agriculture

Residents of the area in and around the Natma Taung National Park in southern Chin State are divided between those in the regional political and economic centers of Kanpetlet and Mindat Townships and those living in the villages around them. The former's residents live a life that is fully integrated into the cash economy, including the existence of a periodic truck transport service between large cities such as Pakokku and Chauk, and they are not involved in agriculture except for limited production for self-sustenance.

On the other hand, residents of surrounding villages (from about one hour to three days on foot from the town center) rely on slash-and-burn agriculture in the mountains and forests and are strongly motivated by the need for self-sustenance (i.e. they are not integrated into the cash economy). While they cultivate staple foodstuffs like corn for self-sustenance through slash-and-burn agriculture, they also acquire cash by participating in road construction, farming of commodity crops, and harvesting from the forest.

To understand the reality of shifting cultivation or slash-and-burn agriculture is to understand the lives of local residents. Therefore, in order to acquire basic local knowledge prior to engaging in forest conservation and resource cultivation initiatives, a study on slash-and-burn agriculture was conducted.

#### Method

At the outskirts of Kanpetlet in Old Town village, the team observed the following activities:

- a) Clearing the forest (began in December 2008 and ended on February 16, 2009)
- b) Setting the fire (March 1, 2009)
- c) Planting corn (March 3, 2009)

These activities were confirmed as legitimate and photographs were taken. The village chief was also interviewed regarding village matters and the status of slash-and-burn agriculture.

#### a) Clearing the forest

Clearing of the forest takes place after the beginning of the dry period from December to February of the next year (Fig. 2). It is important for the felled trees to be sufficiently



Fig. 2. Cutting grass prior to setting fire to prevent over-burning (February 2009).

dry, and thus it usually requires about two months from the time they are felled until they are set on fire. When setting the fire, grass and fallen trees are carefully removed from around the target area to prevent the spread to nearby mountains and residences.

### **b) Setting the fire**

The fire is set on a day with no wind. The forest area that was designated to be burned in this instance was extremely close to village residences so special care was taken so that the fire would not spread. Two villagers with torches set fire on the upper slope and let the fire spread downward (Fig. 3). Flames a few meters high erupted and spread furiously, igniting even the leaves on the highest branches of large unfelled trees (Fig. 4). The target area of about 5,000 m<sup>2</sup> was burned completely in approximately an hour.

### **c) Planting corn**

Planting was conducted two days after burning. The ground was covered with ash and residual heat still remained from the fire. Corn seeds from the previous year's harvest, held in baskets hung from the villagers' shoulders, were planted in the ground, about three at a time, using a strong, long wooden pole (about 1.6 m) to bore a hole in the ground and then nimbly throwing the seeds in (Fig. 5). No effort was made to cover the seeds with soil or to water them.

### **Information from the village chief**

The field where we observed the farm work was a forest that had been untouched for 30 years and all the trees that were felled were large (more than 15 m high with diameters of about 50 cm at breast height). We were informed that felling and burning such mature forests was becoming a rare occurrence. Fields that had been left fallow for a sufficient period yielded a lot of ash after burning, and ash from large trees is highly nutritious. Furthermore, because the trees had provided a lot of shade, there is little weed growth and the land was therefore easier to cultivate after conversion into a field.



Fig. 3. Setting fire with torches (March 2009).



Fig. 4. Flames a few meters high (March 2009).



Fig. 5. Planting corn seeds on the burned slope (March 2009).

### Observation

In the investigated area, population growth has contributed to the shortening of fallowing periods, which was about a 10 year period around 10 years ago but is currently down to about 4 years. As such, the harvest from the same area of land has supposedly decreased to about half of what it used to be. This situation has exacerbated a bad cycle that promotes further slash-and-burn and shorter fallowing periods. Slash-and-burn cultivation itself is actually not the root cause of deforestation but can be described as “a culture that has been developed through a very high-level understanding of the forest ecosystem” (Shirasaka 2004). The slash-and-burn agriculture in this area was probably originally the result of a balanced union between nature and people’s daily lives. However, due to population growth and the decrease in the area of land owned by villages due to the National Park designation in 1994, the balance has been broken and deforestation (prevention of forest regeneration) is occurring.

### Food

Rice is the staple food in Kanpetlet. However, it is impossible to cultivate locally due to a multitude of factors including poor soil fertility, high altitudes, and a rainy season lasting six months out of every year with a resulting lack of sun. All rice is bought in from the Magway Region at the foot of the mountains. Corn, the staple crop of the surrounding villages, is cultivated using slash-and-burn practices. As the harvest is insufficient to satisfy annual demand, deficits are met by buying rice from Kanpetlet. As such, villagers need cash to buy rice to live.

Inhabitants of towns and villages alike cultivate their own vegetables in their own gardens (Fig. 6). Obtaining enough protein is no simple matter, and free-range chicken eggs from home are probably the easiest protein source to come by. This is followed by chicken, pork, and *mithun* (gayal) beef. On average, poor villagers eat meat about once a month. As such, they will eat any wild protein sources that they come across, including field mice, frogs, snakes, and hares (Fig. 7).

Plants cultivated in towns and villages on the outskirts of Mindat (>1500 m altitude) include tea, coffee, avocados, sugarcane, corn, potatoes, limes, tobacco, knotweed (used frequently in cooking), bananas, Assam apples (*Docynia indica*, Rosaceae), and chrysanthemums (used on Buddhist altars).



Fig. 6. Home garden in a village outside Mindat (September 2015).



Fig. 7. Dried frog brought in from Saw (March 2008).

### Soaring food prices

The increasingly open economy over the past few years has caused food prices to soar in Chin State.

**Rice:** Mostly from Chauk, with some transported from Saw. Partly due to rising costs of transportation fees, prices are higher than those at lower altitudes. Although five kinds of rice are now available, prices for all have nearly doubled from 7 to 8 years ago.

1 viss (Myanmar unit of measurement) is 1.6 kg.

MMK: Myanmar Kyats (1USD=1,340MMK as of March 2018)

**Vegetables:** Values on the left and right reflect the price in 2008 and the current price (September 2015), respectively.

Cabbages (1 head)	200 MMK	⇒	700 MMK
Tomatoes (1 viss)	300 MMK	⇒	1,800 MMK
Potatoes (1 viss)	600 MMK	⇒	1,200 MMK
Eggs (12 pcs)	1,000 MMK	⇒	1,000 MMK (8 pcs)
Onions (1 viss)	600 MMK	⇒	1,400 MMK
Chilies (1 bag)	200 MMK	⇒	600 MMK
Ginger (1 viss)	1,000 MMK	⇒	3,000 MMK

### Availability of water

Water is drawn from a stream in the mountain over several kilometers through a PVC pipe (Fig. 8). Segments have been simply fused together with fires, and there are continual problems, such as connections being split, pipes being burned by forest fires, or crushed by wandering *mithan* bull, or clogged by leaves and pebbles. Each such incident causes water to stop flowing, and a meticulous search for the cause of the problem is necessary. Since excessive slash-and-burn agriculture in the forest is rapidly depleting the sources of water, this may well be the biggest issue faced by the Natma Taung people in the future.



Fig. 8. PVC pipes are tied to tree or supported by forked branches to cross a stream (July 2007).

### Fuel

Firewood and charcoal are used as fuel; there is greater use of charcoal in the townships and the surrounding villages rely solely on firewood. Charcoal costs about 3,500 MMK per bag (about 15 kg) and firewood about 2,000 MMK per basket (September 2015). A family using firewood for cooking consumes approximately 2 tons of firewood per year. as a result, it needs to be recognized that one of the benefits of electric power deployment in the area is preservation of the forests.

Since 2015, some wealthier people in Kanpetlet has begun using LP gas to supplement its fuel

needs. Locals with access to cars replenish their supplies in the distant town of Chauk using gas cylinders. Improvement in road infrastructure may, therefore, lead to the increased consumption of gas.

## Electricity

Electricity supply in Kanpetlet is below rudimentary. There is a publicly operated generator, but as it is financially prohibitive to purchase diesel so even town centers receive about two hours of electricity between 7 and 9 in the evening, but only once a week (Fig. 9). The power is mostly being used for lighting, DVD viewing, and karaoke. The few DVD viewing rooms in town use charged batteries and screen Korean dramas (a ticket for one viewing was 100 MMK in 2007).

Since the area is mountainous with a long rainy season, there are streams that do not dry up even during the dry season. The benefits that a mini hydropower installation in such a stream may bring to this area are incalculable. Even if electricity could be provided for only three hours per day, the following benefits could be realized: 1) Students could find time to study at night; 2) Reduction in the use of firewood, thus protecting the forest since, as mentioned above, annual consumption of firewood per family is up to 2 tons; 3) Supply to the hospital would facilitate vaccine preservation and use of X-rays and other medical equipment; and 4) and perhaps most importantly, people would be freed to enjoy leisure activities as night, such as DVD viewing and reading, leading to a decline in the excessive rate of population growth (birth rate).

Currently, the proposed hydroelectric power plant on the Saw river, which will allow local businesses to proliferate, is facing delays in construction. However, a project aimed at installing electrical cable from Magway Region to Kanpetlet is now underway (April 2016) (Fig. 10).



Fig. 9. The diesel generator at the power plant in Kanpetlet (November 2008).



Fig. 10. Newly installed post for power supply in Kanpetlet. Also note a typical house with stilts (April 2016).



Although it remains unclear when the supply of electricity will begin, its continuous availability will change the lives of the locals beyond any expectations.

Note: in the summer of 2019, 24hour power supply started in Kanpetlet finally.

## Communication

Poor communication infrastructure is a problem across Myanmar and is not solely limited to Natma Taung, but it is especially problematic in this area. In the first year of the project, a public telephone facility with a satellite telephone installation was used to communicate with Yangon (overseas phone calls are not permitted from this telephone facility). However, from 2009 CDMA satellite phone service has started to spread, and domestic phone call conditions have dramatically improved. Internet access is provided via the satellite communication network. The internet service at the project office was, of course, the only one in the village.

Price, convenience, and other factors are causing the rapid adoption of mobile phones. Despite this, communicating overseas from Kanpetlet was still impossible in 2015. As SIM cards continue to drop in price, the locals are moving toward a life with smartphones.

## Housing

All of Chin State lies in the mountains. Townships that are central to the southern region of the state, such as Kanpetlet and Mindat, have developed along mountain ridges. As such, the right and left flanks of the townships are sudden steep slopes. Flatlands are very rare, and homes are constructed on stilts on these slopes. The stilts are used to adapt to sharp slopes and also help to release humidity and provide more comfort during the long rainy season (Fig. 10).

Floors and walls are made of single pine wood sheets. Roofs are thatched but, increasingly, tin roofs are replacing them. Inside, a part of the space behind the hearth is set up as a kitchen, and water is used outside on a balcony-like space. There are no drains, and liquids are simply poured down the sides of the hills.

Living conditions differ greatly between the town of Kanpetlet and its surrounding villages. Homes in the latter have thatched walls and floors made of pine planks, whereas the newer houses in the town have concrete floors and walls (rebars are only infrequently used and bricks are plastered over with concrete) and tin roofs.

## Education

Primary and middle school education is mandatory, so even the poorest villagers send their children to school with almost no exception (Fig. 11). Perhaps because of the local culture, students do not ask questions and chant in unison. The level of instruction is not particularly high.

If the children progress to tenth grade, they are given the right to move on to college. The



Fig. 11. A classroom in an elementary school at Oak Pho village (July 2008).

examination to advance to tenth grade is held nationwide on the same day. The exam spans two days, and soldiers even guard the entrances of exam halls. Exam topics include history, Burmese, English, and chemistry. The author was quite surprised at the high level of English in the exam questions that we were shown. As an aside, tiny cheat books for each test subject are being sold (about 3 to 4 cm and properly bound), and most test takers seem to be using them, reminiscent of the historical Chinese exams for prospective government officials. After observing the schools, it seemed that the girls were studying relatively more seriously than the boys.

### Medical facilities

Even in a region like Natma Taung, which is lacking in so many aspects of modern life, we could not overlook the poor medical facilities because of their direct effect on lives.

Both Kanpetlet and Mindat have hospitals (Fig. 12). A skilled doctor is sent from Yangon or from larger cities to work for a period of two years. This doctor makes his rounds not only in Kanpetlet but also in surrounding villages. By conducting medical work in such a remote area, they secure the special privilege of being able to train overseas after the two-year period is over.

Several nurses work at the hospital and support the doctor. If the doctor's check-up (free of charge) results in a prescription, medicine can be bought from the hospital or in the town. If hospitalization is necessary for monitoring, patients can stay at the hospital. However, there are no provisions for meals, among other things, so patients must bring their own bedding and food (Fig. 13). There is no charge for beds, but the villagers' biggest problem is that they cannot afford to pay for medicines and operations, and some must take out loans within their villages. Children commonly suffer from tuberculosis (TB), malaria (which affects both children and adults), burns, and skin diseases due to insufficient bathing.

A refrigerator donated from Japan (solar powered) has been set up to store vaccines for children. Free TB vaccines from UNICEF have been received by the hospital and some children have had them administered. The X-ray machine is used by turning on the generator, but poor villagers are rarely able to pay for an X-ray.



Fig. 12. Patients wait for doctor's examination at Kanpetlet Hospital (April 2013).



Fig. 13. Hospitalized patients at Kanpetlet Hospital (September 2015).

### Religion

Religion plays an important role for the Chin even though Yangon, as a prime example, and most

large cities, including Mandalay, were observed to have seen a decline in the role of religion in daily life. However, for the people of the mountainous Chin State, who live far from cities and long distances from the cash and market economy, religion is part of their daily lives and influences them as much as does food production. As a result, the religion of the Chin people was studied and recorded.

### **Spirit worship**

All ethnic groups under the Chin tribe traditionally believe in spirits (David & Barbara Fraser 2005). The Nat religion, which is a form of spirit worship, is practiced across all areas of Myanmar and is widespread among the Chin (Fig. 14). The name Natma Taung (Mt. Victoria) owes its symbolism to Nat worship; the peak itself, however, has a Buddhist pagoda on it because to the former government's policy of promoting Buddhism.

At the crossroads between the old Burmese capital of Bagan and Natma Taung, there are many shrines to Nat gods and goddesses. Drivers who believe in spirits sound their horns when going past these. In this way, their faith can be seen not only at festivals but also in daily life.



Fig. 14. Statues in a Nat shrine. Road from Kanpetlet to Mindat (September 2015).

### **Christianity**

During the first half of the 19<sup>th</sup> century, when Burma was annexed as part of India under the British, evangelism was promoted to convert animists in the region as part of colonization policy. Initially, Roman Catholicism had taken root, and among modern day Chin it seemed as if Catholics were the most abundant Christians (Fig. 15).

Aside from Catholics, Baptists, Methodists, and members of the Assembly of God have their own respective churches and are quite active. The priests and pastors of each church make periodic rounds of their parish for missionary work. There was an opportunity to dine with a cardinal visiting Kanpetlet from the provincial capital Hakha in the north of Chin State, and we heard how the cardinal himself was taking great pains to train villagers in agricultural skills so that they can secure daily food supplies.



Fig. 15. Sunday mass at the Catholic church in Kanpetlet (March 2009).

### **Buddhism**

It is thought that, traditionally, there were few Chin people who believed in Buddhism. However, much of Chin State, not just limited to Natma Taung, has seen an inflow of Burmese who have arrived as public officials (State Peace and Development Council [SPDC], police, medical personnel, Forestry Ministry, Agriculture and Irrigation Ministry, etc.) and live locally. Civilian migration from areas such as Magway has also been observed and these people are, without exception, Buddhist (Theravada, or in other words Hinayana Buddhists). Because of the

government's pro-Buddhism policy, in order for one to be promoted above a certain level in public office, one must be Buddhist. As a result, numbers of Buddhists and Christians in the Natma Taung region are now almost equal.

One characteristic of Theravada Buddhism is a deep reverence toward monks. Around 8 every morning, monks belonging to the Buddhist monastery in Kanpetlet can be observed receiving alms (Fig. 16). Adherents gather in the monastery on the night of the full moon, reciting and chanting scriptures loudly, another characteristic that is not observed in Mahayana Buddhism. The monastery not only looks after orphans and children from poor backgrounds but also provides primary and secondary education. Out of the 80 children enrolled in the Kanpetlet monastery, about 20 of them became monks after graduation (Sep. 2015).



Fig. 16. Alms offering in the center of Kanpetlet. Rice and dishes to go with these are provided (January 2008).

### Observations

Traditionally, locals were mostly spirit worshippers, but after colonization by the British, Christianity spread through evangelism, and after the war, government policy led to the rise of Buddhism. In both of these religions, religious events have been incorporated into the daily lives of the Chin are greatly influential; for example, Christian traditions such as Sunday mass, saying grace before meals and participation in Christian festivals (Easter, Christmas, etc.), as well as those from the Buddhist faith, such as offerings of flowers and prayer at altars in each home every morning and evening, offerings of flowers at pagodas and offerings of alms. Thus, religion plays a large role in the daily lives of the Chin and other people living in the Natma Taung area. Both Buddhist monks and Christian clergy visit neighboring villages for their missionary work, which aids in strengthening the people's faith, particularly since public organizations do not carry out such activities.

A booklet containing simple information for the conservation of forest resources, cultivation of forest resources, introduction to agroforestry, preparation methods for fertilizers, etc. (with drawings and text in Burmese and sometimes Chin) is encouraged to be prepared and utilized by clogymen as part of their services and it must be very useful to the populace.

## Traditional Chin culture

As mentioned previously, the livelihoods of the people of Kanpetlet and its neighboring villages differ greatly. The lives of the Chin "forest people" have traditionally been far removed from the cash economy, but the changes occurring in society may hasten the disappearance and dilution of these unique customs. These are detailed here as recorded over years of visits and observations.

### Attire

Western dress has skyrocketed in popularity among males and females alike, though female villagers still wear clothes made from textiles that they weave at home. Traditional attire is more often worn by females than males (Fig. 17 & 18). Young men, especially, are commonly seen in jeans.



Fig. 17. A villager is wearing his longyi (Pa Soe) with a southern Chin design. A bamboo basket with a 'Chin knife' is a necessary item for men. Kanpetlet (April 2016).



Fig. 18. A lady in typical southern Chin tunic and longyi (Hta Mein). Note her tattooed face. Mindat (April 2016).

### Weaving

Central to traditions of the Chin are textiles woven by hand (Fig. 19). Designs are unique to each ethnic group; upon seeing a specific design, one can immediately deduce the tribe of the wearer. Textiles are also presented as a formal gift to guests from distant places.

Thoroughly researched information on the textiles from Chin State can be obtained from this text:

Fraster D. W. and Fraster B. G. 2005. *Mantles of Merit: Chin Textiles from Myanmar, India and Bangladesh*. River Books Co., Ltd, Thailand.



Fig. 19. A village woman is weaving in Kanpetlet (March 2018).

### Mithan feast

To the Chin, the Mithan feast (a celebration of the gayal or Mithan bull, *Bos frontalis*) is the largest and most important ceremony. Villagers pool their resources to obtain a Mithan bull, which they then slaughter in the ceremony. Its skull and horns are then hung as decoration in front of houses, and the households possessing more horns are those that yield more power in the village (Fig. 20).



Fig. 20. A Mithan feast that we participated in on the outskirts of Mindat. The sacrificed cow's head and heart are lashed onto a wooden post (February 2008).



Fig. 21. A lady with her granddaughter in Kanpetlet (April 2016).



Fig. 22. Dancers from So Long village in southern Chin traditional costume (April 2013).

### Tattooed females

In the southern Chin region, many of the more senior females possess face tattoos of several designs (Fig. 21). The author recognized at least three completely different patterns which clearly show the particular ethnic group the lady belongs to. Younger generations do not exhibit such markings because the tradition has been prohibited by the central government.

### Dancing and nose flute

Dancers in traditional clothing and accessories move to the monotonous and non-melodious rhythms of gongs and bells (Fig. 22). Though the author has not been fortunate enough to be able to listen to local folk songs, a senior lady in Mindat did play her songs about the love between husband and wife with her nose flutes (Fig. 23).

### Tools

Since the daily lives of the Chin people are closely linked to the forest, a short knife named the "Chin knife" is a necessary tool that is always carried by the men (Fig. 24). The knife is useful in



Fig. 23. An old lady plays her nose flute. Note huge decoration attached directly into her earlobes in Mindat (September 2015).



Fig. 24. A villager uses his 'Chin knife' to prepare firewood in Kanpetlet (April 2016).



Fig. 25. Villagers of Hilong village cutting up a tree that had fallen and blocked a road (August 2007).

many ways, including for hacking away at branches that block mountain paths, cutting wood, and even peeling the skin of fruits. It is carried in a scabbard basket made from local bamboo. Another traditional tool is a large saw that must be handled by two people and is used for felling trees and manufacturing large planks of wood (Fig. 25).

### **Chin beer**

The brewing of alcohol is carried out by the fermentation of finger millet; this traditional alcoholic beverage is popular with both sexes and has low alcohol content (Fig. 26). Many households brew their own and take pride in their homemade concoctions.



Fig. 26. Water is added before serving in Kanpetlet (September 2015).

## **Reference**

Shirasaka, S. 2004. Changing traditional Swidden in the southern mountains of Yunnan Province, China. *J. Geogr.* 113: 273–282.





## **Brief history of botanical inventory in Natma Taung National Park between Forest Department and Makino Botanical Garden**

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The Kochi Prefectural Makino Botanical Garden (MBK), Japan has launched a joint research project with the Forest Department (FD), Ministry of Forestry (currently Ministry of Natural Resources and Environmental Conservation) that combines a floristic inventory and subsequent economic botanical development for the conservation of natural resources in Myanmar under the Memorandum of Understanding signed on March 23, 2000. Dr. Tetsuo Koyama<sup>1</sup>, the former Director General of MBK from 1999–2016, initiated the cooperative program to inventory the plants of Myanmar. Since then systematic plant explorations have been conducted in protected areas, such as Popa Mountain Park in Mandalay Region, Natma Taung National Park in Chin State, Alaungdaw Kathapa National Park in Sagain Region and Panlaung-Pyadalin Cave Wildlife Sanctuary in Shan State, as well as in several other places in the states of Kayin and Kachin by MBK and its associated institutions in collaboration with FD. At present, over 32,000 herbarium specimens of vascular plants have been collected from Myanmar by collaborative research between FD and MBK. All specimens have been deposited in either the national park office or the herbarium of Forest Research Institute (FRI, international herbarium acronym is RAF), and MBK. Based on these collections, numerous new species and records have been reported, and a checklist for the flowering plants of Mt. Popa was published (Tanaka et al. 2006). The floristic inventories are ongoing and we aim to produce additional specimen-based, annotated checklists for each research area. Here a brief history of the botanical inventory and the subsequent research findings in Natma Taung National Park from this collaboration is summarized.

### **Botanical Inventory**

The Makino Botanical Garden started a field inventory in Natma Taung National Park, Chin State in March of 2002, in an area restricted to foreign visitors at the time. Botanical inventories continued until 2014 in the national park and adjacent areas in collaboration with the national park office, which belongs to the Nature and Wildlife Conservation Division, FD. As a result, more than 15,500 herbarium specimens were housed at MBK (Table 1).

The progress in Natma Taung NP can be viewed as three phases. In the first phase, the primary aim was to collect specimens that represent as complete picture of the flora as possible from the national park. In the second phase, MBK targeted community development for rural villagers and capacity building for national park staff for the conservation of plant resources, alongside of the continuing floristic inventories in the area. In the third phase, our research focused more

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Table 1. Expeditions to Natma Taung National Park and adjacent area in the years 2002-2014 &amp; Members.

Year	Date	Visit Area (Township)	Members	No. of specimens
2002	Mar. 8 - 14	Kanpetlet	Jin Murata, Hidetoshi Nagamasu, Nobumitsu Kawakubo, Hiroyuki Akiyama, Nobuhito Kuroiwa, Ayako Maeda	367
2002	June 2 - 9	Kanpetlet, Saw	Nobuyuki Tanaka, Takashi Sugawara, Noriaki Murakami, Kyoko Aoki, Shoko Sakai, Kana Watanabe, Khin Myo Htwe	649
2002	July - Nov.	Kanpetlet, Saw	Ling Shein Man, Cho Cho Win	180
2002	Nov. 30 - Dec. 11	Kanpetlet, Mindat, Saw	Jin Murata, Nobuyuki Tanaka, Takashi Sugawara, Tomoyuki Nemoto, Yu Iokawa, Fumio Shimozone, Hong Mang, Ling Shein Man, Cho Cho Win	898
2003	Feb. - Apr.	Kanpetlet	Ling Shein Man, Cho Cho Win	122
2003	Apr. 22 - 30	Kanpetlet, Mindat, Saw	Jin Murata, Nobuyuki Tanaka, Takashi Sugawara, Tomohisa Yukawa, Noritoshi Inagaki, Hong Mang, Ling Shine Man, Cho Cho Win	229
2004	Feb. 27 - Mar. 5	Kanpetlet, Mindat, Saw	Nobuhito Kuroiwa, Kazumi Fujikawa, Hana Sonoki	219
2004	May 13 - 25	Kanpetlet, Mindat, Saw	Nobuyuki Tanaka, Takashi Sugawara, Shiro Kobayashi, Tetsuo Toma, Toshiyuki Akiyama, Kana Watanabe	676
2005	Dec.	Kanpetlet, Saw	Ling Shein Man	91
2006	Mar. 3 - 10	Kanpetlet, Saw	Hidetoshi Nagamasu, Koji Yonekura, Tetsuo Ooi -Toma, Ling Shine Man	372
2006	Mar. 16 - 24	Kanpetlet, Mindat, Saw	Kazumi Fujikawa, Atsushi Nomachi	253
2006	through a year	Kanpetlet, Saw	Ling Shein Man, Aung Htay	213
2007	Feb. 13 - Mar. 2	Kanpetlet, Mindat, Saw	Kazumi Fujikawa, Nobuhito Kuroiwa, Ayako Maeda, Chika Mouri, Takashi Watanabe, Khin Myo Htwe, Ling Shine Man, Hong Mang, Aung Htay	258
2007	May 15 - 20	Kanpetlet	Nobuyuki Tanaka, Santi Wathana, Mano Tamaragusa, Shigeo Yasuda	56
2007	May 23 - June 2	Kanpetlet, Saw	Kazumi Fujikawa, Nobuhito Kuroiwa, Ayako Maeda, Prachaya Srisanga, Ling Shein Man	306
2007	through a year	Kanpetlet, Saw	Ling Shein Man, Hong Mang, Aung Htay	401
2008	May 24	Kanpetlet	Mitsuo Matsumoto, Takashi Watanabe	15
2008	July 30 - Aug. 17	Kanpetlet, Mindat, Saw	Kazumi Fujikawa, Kenji Kano, Mitsuo Matsumoto, Ling Shein Man, Hong Mang	528
2008	Aug. 8 & Dec. 6 - 10	Kanpetlet	Mitsuo Matsumoto	98
2009	June 21 - 29	Kanpetlet	Nobuyuki Tanaka, Tomohisa Yukawa	307
2009	Dec. 8 - 15	Kanpetlet	Kazumi Fujikawa, Hong Mang, Maung Nu, Aung Zaw Ling	105
2007-2009	through a year	Kanpetlet, Mindat, Saw	Shigeo Yasuda	350
2011	Jan. 16 - 19	Kanpetlet, Mindat, Saw	Kazumi Fujikawa, Mitsuo Matsumoto, Tin Mya Soe, Toe Min Min Mon, Ling Shein Man	74
2011	Sep. 1 - 15	Kanpetlet, Saw	Hidenobu Funakoshi, Hong Mang, Ling Shein Man, Wai Min Htay	306
2011	through a year	Kanpetlet, Mindat, Saw	Tin Mya Soe, Ling Shein Man, Hong Mang, Ha Shein Ohm, Law Shine	1321
2012	Feb. 10 - 23	Kanpetlet, Mindat, Saw	Kazumi Fujikawa, Hiroshi Ikeda, Motohiro Hamaguchi, Nobuko Yamamoto, Prachaya Srisanga, Min Min San, Ling Shein Man, Law Shine	669
2012	Apr. 26 & Aug. 28	Kanpetlet	Mitsuo Matsumoto	40
2012	May 19 - June 4	Kanpetlet, Mindat, Saw	Kazumi Fujikawa, Santi Wathana, Kittiphong Kertsawang, Tin Mya Soe, Myint Hlaing, Ling Shein Man, Law Shine, Htun Tin	520
2012	Dec. 1 - 13	Kanpetlet, Mindat, Saw	Kazumi Fujikawa, Katsunori Miyake, Kota Yabe, Mu Mu Aung, Ling Shein Man, Law Shine	793
2012 - 2013	through a year	Kanpetlet, Saw	Ling Shein Man & Law Shine	1336
2013	Feb. 25 - Mar. 3	Kanpetlet, Mindat, Saw	Sunisa Sangvirotnjanaphat, Santi Wathana, Mitsuo Matsumoto, Ling Shein Man, Law Shine	231
2013	June 15 - July 30	Kanpetlet, Mindat, Matupi, Saw	Mu Mu Aung, Ling Shein Man, Law Shine	832
2013	Aug. 20 - Sep. 15	Kanpetlet, Mindat, Saw	Kazumi Fujikawa, Prachaya Srisanga, Charun Maknoi, Ling Shein Man, Law Shine	1554
2014	Jan. 9 - 20	Mindat	Law Shine	29
2014	Feb. 20 - Mar. 16	Kanpetlet, Mindat, Matupi, Saw	Prachaya Srisanga, Monthon Norsaesngri, Robert Unwin, Michele Rodda, Eric Schuettepelz, Tin Tin Mu, Ling Shein Man, Law Shine, Kazumi Fujikawa	1033
2014	Apr. 21 - 28	Kanpetlet, Mindat, Saw	Ayako Maeda, Kittiphong Kertsawang, Ling Shein Man, Law Shine	353

specifically on documenting the flora of Natma Taung National Park in collaboration with an international collaborative team of botanists.

In the first phase of exploration in Natma Taung National Park (2002–2006), the botanical inventories were led by Dr. Nobuyuki Tanaka<sup>2</sup> from MBK and Prof. Dr. Jin Murata from the University of Tokyo (TI), Japan. Many specimens of vascular plants and bryophytes were collected. An important publication from this phase was “Mosses of Natma Taung (Mt. Victoria) National Park” published by Tanaka et al. (2003). In total, 35 families, 102 genera, and 152 species were recognized. The region’s similarity to the Himalayan flora was also discussed, as a number of genera and species of flowering plants found here are also common to eastern India and eastern Nepal (WWF & IUCN 1994–1995), and a similar pattern was found for the mosses (Tanaka et al. 2003).

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In the second phase (2007–2014), MBK and FD jointly started a project supported by Japan International Cooperation Agency (JICA) Partnership Program in the national park. The major objectives were to protect plant resources, to establish their sustainable use, and to educate local community members. Although the Natma Taung National Park is rich in plant resources, such as *Dendrobium* spp. (Orchidaceae), *Paris polyphylla* (Melanthiaceae), *Amorphophallus* spp. (Araceae) traded at high prices for exporting to overseas, the plants are threatened by overexploitation such as illegal picking and over-collecting of natural resources and shortened fallow periods of shifting cultivation. The program was designed to provide an alternative and sustainable income to reduce the impact on the environment, and also educate and train the technicians of FD in the fields of botany and conservation. Queen Srikrit Botanic Garden (QBG), Chiang Mai, Thailand, which is MBK's sister-botanical garden, cooperated with the project, and several of their researchers joined the field inventories. Both Dr. Prachaya Srisanga and Dr. Santi Watthana<sup>3</sup> from QBG visited the national park several times to share their knowledge and research techniques in botanical inventory and orchid propagation in particular with national park staff members. Mr. Shigeo Yasuda was the resident manager of the project from 2007 to 2009. He collected primarily orchids throughout the year, together with Mr. Hong Mang, who was a ranger at the national park. In addition to their collections, a lot of valuable specimens were accumulated by Ms. Ling Shein Man and Mr. Law Shine. The second phase of botanical inventory was undertaken by the national park staff under the management of the park wardens, Mr. Shein Gay Ngai (until 2010) and Mr. Tin Mya Soe (2010–2014). Duplicates of specimens were sent to collaborating institutions, and specialists for species identification and enumeration.

Natma Taung National Park covers three Townships: Kanpetlet, Mindat, and Matupi. It also contains Natma Taung (Mt. Victoria), the highest mountain in the park which is located in Kanpetlet Township. Most expeditions were conducted in the southern portion of the park, with the national park office in Kanpetlet as the base camp for expeditions. Access to Kanpetlet and Mindat Townships from various cities, such as Yangon and Mandalay via Bagan and Pakkok, was more realistic, since both townships are a gateway to the national park and eco-tourism areas. The northern Matupi area of the national park was more challenging, since it had been closed to foreigners for a while, and is difficult to access in the rainy season due to poor road conditions and the presence of steep cliffs between Mindat and Matupi. The international team, FoMIC (FoMIC = Flora of Myanmar Institutional Consortium) was able to enter the northern area, and collected over 1,000 herbarium specimens in 2014. The FoMIC in Myanmar was convened by the FD in March 2013, with the intention of working on the flora of Myanmar; however, this movement stalled because a multilateral Memorandum of Agreement was not completed (Middleton et al. 2020).

During the second phase, a report on the sustainable development project supported by JICA was published (Fujikawa & Yasuda 2012), as were three booklets for conservation and education (Fujikawa et al. 2008, 2009, 2015). These publications were not scientific, but rather promoted a better understanding of Natma Taung National Park's plant diversity. All four can be downloaded from the MBK's website (<https://www.makino.or.jp/multilingual/wts.php?lang=en>).

In the third phase (2015–2020), our focus shifted more specifically to documenting the flora of Natma Taung National Park. A total of 55 botanists belonging to 24 institutions worldwide joined this phase of the project to publish a taxonomic enumeration of the region. Publication was originally planned for 2017, but the process was delayed leading to the decision to publish the work as a series. The Taxonomic Enumeration of Natma Taung National Park Vol. 1 included 22

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families, 68 genera, and 174 species of lycophytes & pteridophytes, and 5 families, 6 genera, and 7 species of gymnosperms. Vol. 2 will include only Orchidaceae and is forthcoming. Following these publications an enumeration of the angiosperms will also be forthcoming. Given the success of this project, MBK and FD will continue to collaborate on field intensive surveys in other regions of the country and on related taxonomic research.

## Research Findings

A total of 17 new species, 3 new varieties, and 1 new nothospecies of flowering plant were discovered from the Natma Taung National Park and adjacent areas based on the specimens collected between 2002 and 2014 (Table 2). Six taxa of Cyperaceae, three each of Acanthaceae and Ranunculaceae, two each of Asteraceae and Orchidaceae, one each for Balsaminaceae, Convolvulaceae, Rubiaceae, Smilacaceae, and Zingiberaceae were described. In addition to MBK's activities, Natma Taung National Park is one of the areas in Myanmar that has been the subject of repeated and concentrated collecting efforts by various research institutions, such as the Korean National Institute of Biological Resources, and the Chinese Academy of Science led by Xishuangbanna Tropical Botanical Garden (Middleton et al. 2019). Numerous new taxa were described (Yang et al. 2020), and a guidebook entitled "Seed Plants of Natma Taung National Park" was published (Kang et al. 2018). We can expect that there may be many more undescribed

Table 2. New taxa discovered from Natma Taung National Park and adjacent area based on collections in the years 2002-2014.

Family Species	Type specimen	Reference
<b>Smilacaceae</b>		
<i>Heterosmilax pertensis</i> T.Koyama var. <i>parviflora</i> T.Koyama	Ling Sein Man 093214	Makinoa, n.s. 11: 63 (2016)
<b>Orchidaceae</b>		
<i>Dendrobium koyamae</i> Nob.Tanaka, T.Yukawa & J.Murata	N. Tanaka et al. 200040042	Acta Phytotax. Geobot. 60: 172 (2010)
<i>Doritis natmataungensis</i> T.Yukawa, Nob.Tanaka & J.Murata*	J. Murata et al. 029289	Acta Phytotax. Geobot. 60: 167 (2010)
<b>Zingiberaceae</b>		
<i>Hedychium natmataungense</i> Nob.Tanaka	N. Tanaka 10-59	Bull. Natl. Mus. Natur. Sci., Tokyo B 42: 63 (2016)
<b>Cyperaceae</b>		
<i>Carex leptogyna</i> T.Koyama	M. Matsumoto & Hong Man 084083	Taiwania 63: 1 (2018)
<i>Carex matsumotoi</i> T. Koyama	M. Matsumoto 088451	Makinoa, n.s. 11: 49 (2016)
<i>Carex nitiditriculata</i> L.K.Dai var. <i>heterostachya</i> T.Koyama	N.Tanaka et al. 023604	Makinoa, n.s. 11: 52 (2016)
<i>Carex thailandica</i> T.Koyama var. <i>brevirostris</i> T.Koyama	Ling Sein Man 092974	Taiwania 63: 3 (2018)
<i>Fimbristylis fujikawae</i> T.Koyama	K. Fujikawa et al. 095142	Makinoa, n.s. 11: 55 (2016)
<i>Fimbristylis pulvispicula</i> T.Koyama	A. Maeda et al. 099215	Makinoa, n.s. 11: 53 (2016)
<b>Ranunculaceae</b>		
<i>Aconitum jin-muratae</i> Kadota & Nob.Tanaka	J. Murata et al. 025165	J. Jap. Bot. 85: 200 (2010)
<i>Clematis pseudopterantha</i> Kadota & Nob.Tanaka	Ling Shein Man & Cho Cho Win 024432	J. Jap. Bot. 85: 205 (2010)
<i>Thalictrum tamurae</i> Kadota & Nob.Tanaka	J. Murata et al. 024590	J. Jap. Bot. 85: 208 (2010)
<b>Balsaminaceae</b>		
<i>Impatiens kingdon-wardii</i> Nob.Tanaka & T.Sugaw.	N. Tanaka et al. 024566	Phytotaxa 234: 90 (2015)
<b>Rubiaceae</b>		
<i>Argostemma victorianum</i> Nob.Tanaka	N. Tanaka et al. 023632	Blumea 55: 65 (2010)
<b>Convolvulaceae</b>		
<i>Argyria decemloba</i> Traiperm, Fujikawa & Staples	K. Fujikawa et al. 095008	Willdenowia 49: 66 (2019)
<b>Acanthaceae</b>		
<i>Eranthemum natmataungense</i> J.R.I.Wood	Law Shine 096358	Makinoa, n.s. 11: 67 (2016)
<i>Strobilanthes muratae</i> J.R.I.Wood	J. Murata et al. 022905	Kew Bull. 64: 39 (2009)
<i>Strobilanthes tanakae</i> J.R.I.Wood	J. Murata et al. 025237	Kew Bull. 64: 41 (2009)
<b>Asteraceae</b>		
<i>Ainsliaea hederifolia</i> Fujikawa & H.Ikeda	H. Nagamasu et al. 035401	J. Jap. Bot. 92: 88 (2017)
<i>Himalaiella natmataungensis</i> Fujikawa**	K. Fujikawa et al. 082033	Makinoa, n.s. 10: 168 (2012)

\*Treated as *Phalaenopsis natmataungensis* (T.Yukawa, Nob.Tanaka & J.Murata) Dalström & Ormerod in Orchids (West Palm Beach) 79: 702 (2010).

\*\*Treated as *Jurinea natmataungensis* (Fujikawa) Fujikawa in Taxon 69: 708 (2020).

species to be discovered from these collected specimens, and research is ongoing.

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## Part 2. Taxonomic Enumeration of Natma Taung National Park



*Pinus kesiya* forest

## Arrangement of the Enumeration

The present volume of enumeration of vascular plants of Natma Taung National Park and adjacent areas comprises Lycophytes & Pteridophytes and Gymnosperms. The families in Lycophytes & Pteridophytes are arranged in alphabetical order, and the families in Gymnosperms are arranged in the sequence presented in Christenhusz et al. (2011). Genera, species, and infraspecific taxa in each family are arranged in alphabetical order. The authors for each treatment are shown at the beginning of the phyla in Lycophytes & Pteridophytes, and each family in Gymnosperms.

Dichotomous keys to genera and species are not included in this volume. In Myanmar, or even in Chin state, only a partial flora is known, and keys may lead to misidentification as new records or new species are likely to be found. Standardised author(s) abbreviations of taxa follow Brummitt & Powell (1992) and The International Plant Name Index (<https://www.ipni.org/>) for additional authors after the date of publications. Basionyms where appropriate, and selected synonyms for those related to Myanmar, are given in italics, followed by author(s) and bibliographic citations. Protologues and selected bibliographical citations are listed in the standard abbreviation formats published in Lawrence et al. (1968), Bridson & Smith (1991) and Bridson et al. (2004). If no recommendations were made in the publications, we give the full titles.

The specimens cited are listed only for those identified by the authors and those chiefly housed in the Herbarium of the Kochi Prefectural Makino Botanical Garden (MBK). The list is arranged in the following order: Chin State, Kanpetlet, Mindat, Matupi Township to Magway Region, Saw Township. In each township, specimens are arranged first by those without altitude recorded, followed by altitude records from low to high. Where a recorded altitude is available, it is given in metres above sea level, after the locality. Then the date of collections, collectors and their reference numbers are shown. Information of the locality is based on specimens' label data, and Natma Taung National Park is abbreviated as NMT NP.

For taxa that extend beyond Myanmar, countries of distribution are listed in the order from west to east within Asia first, then continued to the eastwards for the countries elsewhere. In parts, where it is more informative than listing countries, a generalised range such as 'Himalaya', 'cosmopolitan', 'pantropical' or 'Pacific islands' is used.

Notes include supporting information and discussion that may be useful.

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## Lycophytes & Pteridophytes

Kiyotaka Hori

The Ferns of Burma was firstly documented by Dickason (1946), reported 460 species of pteridophytes belonging to 104 genera, and listed 140 species as first records. However, Lycophytes and partial family of pteridophytes (e.g. Equisetaceae) was not listed. Recently, Thet Yu Nwe (2009) newly reported several pteridophytes from Kyaik-Hti-Yoe Wildlife Sanctuary: *Araiostegia imbricata* Ching, *Bolbitis copelandii* Ching ex C.Chr. & Tard., *Crypsinus cruciformis* (Ching) Tagawa, *Crypsinus ebenipes* (Hook.) Copel., *Doryopteris concolor* (Langst. & Fisch) Kuhn, *Elaphoglossum malayense* Holtt., *Davallia trichomanoides* Blume, *Humata vestita* Blume, *Lemmaphyllum carnosum* (Hook.) Presl., *Microlepia strigosa* (Thunb.) Kaulf., *Microsorium scolopendrium* (Burm.f.) Copel., and *Pleocnemia irregularis* (C.Presl) Holttum. Thet Yu Nwe et al. (2016) newly reported pteridophytes from Natma Taung National Park in the Chin State: *Adiantum monochlamys* D.C.Eaton, *Ctenitis decurrentipinnula* (Ching) Ching, *Pteris tripartita* Sw. and *Paragymnopteris vestita* Hook. K.H.Shing. Phyo Kay Khine et al. (2017) listed 299 species belonging to 72 genera and 24 families of lycophytes and pteridophytes from Northern Myanmar including new records. They also compared the flora between northwestern region (Natma Taung, Chin State) and north region (Hponkanrazi + Hponyinrazi, Kachin State) in Myanmar, found different maximum species richness (in Natma Taung 2,200 m, in Hponkanrazi + Hponyinrazi 1,200 m). Furthermore, Thet Yu Nwe et al. (2019) newly reported pteridophytes from Natma Taung National Park in the Chin State: *Pteris bella* Tagawa, *Dryopteris lepidopoda* Hayata and *Loxogramme duclouxii* H.Christ.

In this enumeration, two families, three genera and seven species of lycophytes and 20 families, 65 genera and 167 species of pteridophytes of Natma Taung National Park are listed. Family order was followed by Flora of China (Flora of China Editorial Committee, 2013). The genera and species in a family are arranged in alphabetical order. The following species were newly reported from Myanmar in this enumeration: *Antrophyum callifolium* Blume, *Hymenasplenium retusulum* (Ching) Viane & S.Y.Dong, *Deparia wilsonii* (Christ) X.C.Zhang, *Elaphoglossum angulatum* (Blume) T.Moore, *Neolepisorus ovatus* (Wall. ex Bedd.) Ching, and *Polypodiodes lachnopus* (Wall. ex Hook.) Ching. I removed *Adiantum* cf. *incisum* C.Presl, *Sphaerostephanos validus* (Christ) Holttum, *Bolbitis crispata* (Wall.) K.Iwats., *Elaphoglossum stelligerum* (Wall. ex Baker) T.Moore ex Salomon, *Polystichum lentum* (D.Don) T.Moore, *P. manmeiense* (Christ) Nakaike, *P. pseudotsus-simense* Ching, *Arthromeris amplexifolia* Ching, *Loxogramme subecostata* (Hook.) C.Chr., *Goniophlebium mengtzeense* (Christ) G.Roedl-Linder, *G. dareiformis* (Hook.) Ching ex Tardieu & C.Chr., reported by Phyo Kay Khine et al. (2017) from this list because these species have problems of taxonomic treatments and/or scientific names. There were cosmopolitan species to East Asia, Southeast Asia to Malaya such as *Lycopodium japonicum*, *Selaginella involvens*, *Equisetum ramosissimum* subsp. *debile*, *Crepidomanes latealatum*, *Pteris wallichiana*, *Asplenium ensiforme*, *Dryopteris hendersonii* and pantropic species such as *Hymenophyllum polyanthus*, *Marsilea minuta*, *Pteridium revolutum*, *Adiantum philippense*, *Cheilanthes farinosa*, *Pteris biaurita*, *P. cretica*, *P. vittata*, *Cyclosorus dentatus*, *C.*

*interruptus* and *Nephrolepis cordifolia*. There were also the species which are distributed mainly in southern China to Himalaya such as *Selaginella bisulcata*, *Angiopteris helferiana*, *Microlepia platyphylla*, *Pteris aspericaulis* var. *aspericaulis*, *Dryopteris fructuosa*, *D. marginata*, *Arthromeris wallichiana*, *Loxogramme chinensis*, *Pyrrosia stenophylla*. A few species are distributed in more west regions including Afghanistan, Pakistan, India to Himalaya such as *Athyrium mackinnoniorum* and *Polystichum piceopaleaceum*. The species of Athyriaceae, Dryopteridaceae and Polypodiaceae were found richer than that of Malaya. These characteristics are well coincided to the whole fern flora of Myanmar (Dickason 1946).

This enumeration firstly reported reproductive mode of pteridophytes in Myanmar. Manton (1950) reported reproductive mode (Manton 1950) of 30 pteridophyte species which belong to the genera which appears to have taxonomic confusion. Of the eight species were apogamous such as *Pteris biaurita*, *P. cretica* and *Dryopteris atrata*, 22 were sexual such as *Cheilanthes farinosa*, *Hymenasplenium retusulum*, *Polystichum semifertile* and one species was both (*Pteris fauriei* s.l.). This information must be useful to understand classification of Asian pteridophytes.

## Lycophytes

### Lycopodiaceae P. Beauv. ex Mirb.

**Huperzia delavayi** (Christ & Herter) Ching in Acta Bot. Yunnan. 3: 303. 1981; Fl. China 2–3: 19. 2013.

Distribution. China.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Lycopodium japonicum** Thunb., Syst. Veg. 14: 944. 1784; Fl. China 2–3: 30. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 8 June 2002, *N. Tanaka et al.* 023805 (MBK); 7 miles from the entrance of National Park, NMT NP, 2435 m, 5 Dec. 2012, *K. Fujikawa et al.* 090927 (MBK); along unpaved road at 10-14 miles from entrance of National Park between Kanpetlet and Mindat road, NMT NP, 2680 m, 28 Aug. 2013, *K. Fujikawa et al.* 094617 (MBK). Mindat Township: along walking trail between 17 miles junction from Mindat and Hilong village, 1670-2445 m, 9 Dec. 2012, *K. Fujikawa et al.* 090945 (MBK); from Mindat to northern part of Mt. Victoria, NMT NP, ca. 2350-2550 m, 7 Dec. 2002, *J. Murata et al.* 024730 (MBK); roadside between 15 miles and 10 miles from Mindat, walking towards Mindat around 4 miles, NMT NP, 2460 m, 3 Mar. 2014, *P. Srisanga et al.* 097521 (MBK); near 16 miles Forest camp, NMT NP, 2530 m, 25 July 2013, *Mu Mu Aung & Law Shine* 092722 (MBK); 37 miles from Mindat, between Mindat and Matupi (Mindat-Matupi Road), NMT NP, ca. 2545 m, 8 Dec. 2012, *K. Fujikawa et al.* 090941 (MBK).

Distribution. India, Nepal, Bhutan, China, Japan, Laos, Cambodia, Vietnam; other countries of S Asia.

**Phlegmariurus fordii** (Baker) Ching in Acta Bot. Yunnan. 4: 126. 1982; Fl. China 2–3: 25. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053557* (MBK); Yelong Pan village, NMT NP, 1371 m, 15 Jan. 2012, *Ling Shein Man 088230* (MBK); ca. 1500 m, 24 May 2008, *M. Matsumoto & T. Watanabe 080964* (MBK).

Distribution. India (E Himalaya), China, Japan.

**Phlegmariurus hamiltonii** (Spreng. ex Grev. & Hook.) Li Bing Zhang, Fl. Reipubl. Popularis Sin. 6(3): 42. 2004; Fl. China 2–3: 24. 2013.

— *Lycopodium hamiltonii* Spreng., Syst. Veg. 16: 429. 1828.

Specimens examined. CHIN STATE. Kanpetlet Township: Old town village, NMT NP, ca. 2000 m, 21 Oct. 2012, *Ling Shein Man 091819* (MBK). Mindat Township: along the walking trail between Hilong village and 14 miles junction from Mindat (Mindat-Matupi road), NMT NP, 2200 m, 24 May 2012, *K. Fujikawa et al. 089208* (MBK); along the roadside between Mindat and Matupi township, NMT NP, ca. 2400-2600 m, 18 May 2004, *N. Tanaka et al. 030702* (MBK).

Distribution. India, Nepal, Bhutan, China.

### **Selaginellaceae Willk.**

**Selaginella bisulcata** Spring in Mém. Acad. Roy. Sci. Belgique. 24: 259. 1850; Fl. Thailand 3: 27. 1979; Fl. China 2–3: 59. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: Hkouk Htu village, NMT NP, 1700 m, 18 Jan. 2011, *M. Matsumoto 084073* (MBK); along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2030 m, 11 Feb. 2012, *K. Fujikawa et al. 086532* (MBK); NMT NP, 2215 m, 6 June 2002, *N. Tanaka et al. 023759* (MBK); ca. 2450-2500 m, 12 Mar. 2002, *J. Murata et al. 022063* (MBK); along the roadside between 4 and 6 miles from Kanpetlet to Natma Taung (Mt. Victoria), NMT NP, 2340 m, 31 July 2008, *K. Fujikawa et al. 053037* (MBK); along the road between Kanpetlet and 16 miles base camp, NMT NP, 2600 m, 10 Dec. 2008, *M. Matsumoto 053581* (MBK). Mindat Township: along the roadside between Mindat and Matupi Township (56 miles N of Mindat), NMT NP, ca. 2400-2500 m, 17 May 2004, *N. Tanaka et al. 030859* (MBK).

Distribution. N India, Nepal, Bhutan, China, Thailand, Vietnam, Indonesia (Java).

**Selaginella braunii** Baker in Gard. Chron. 1867: 1120; Fl. China 2–3: 52. 2013.

Distribution. China, Malaysia (Peninsular).

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Selaginella chrysocaulos** (Hook. & Grev.) Spring in Bull. Acad. Roy. Sci. Bruxelles. 10: 232. 1843; Fl. China 2–3: 57. 2013.

Distribution. Pakistan, India, Nepal, Bhutan, China, Thailand, Malaysia (Peninsular), Vietnam.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Selaginella involvens** (Sw.) Spring in Bull. Acad. Roy. Sci. Bruxelles. 10: 136. 1843; Fl. Thailand 3: 24. 1979; Fl. China 2–3: 53. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: between the guest house and Popa village, NMT NP, 3 June 2002, *N. Tanaka et al.* 023731 (MBK); Yelong Pan village, NMT NP, ca. 1500 m, 24 May 2008, *M. Matsumoto & T. Watanabe* 080968 (MBK); around Makyauk Ar village, NMT NP, 1520 m, 3 Dec. 2012, *K. Fujikawa et al.* 090473 (MBK); water resort area, near Kanpetlet, ca. 1828 m, 4 Jan. 2012, *Ling Shein Man* 088103 (MBK). Matupi Township: Pong Thsala waterfall on Laemio river, approximately 3 miles from Tisawn village, NMT NP, 1283 m, 8 Mar. 2014, *P. Srisanga et al.* 097700 (MBK). MAGWAY REGION. Saw Township: Thee Kone village, ca. 304 m, 20 Nov. 2011, *Ling Shein Man* 087877 (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, China, Korea, Japan, Thailand, Laos, Vietnam, Malaysia, Philippines.

**Selaginella labordei** Hieron. ex Christ in Bull. Acad. Int. Géogr. Bot. 11: 272. 1902; Fl. China 2–3: 58. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto* 088475 (MBK); Old town village, NMT NP, ca. 2000 m, 15 Sep. 2012, *Ling Shein Man* 091746 (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al.* 053399 (MBK).

Distribution. China.

**Selaginella minutifolia** Spring, Monogr. Lycopod. 2: 239. 1850; Fl. Thailand 3: 28. 1979; Fl. China 2–3: 58. 2013.

Specimens examined. MAGWAY REGION. Saw Township: near Saw, along the roadside between Saw and Kazunma, 470 m, 9 Aug. 2008, *K. Fujikawa et al.* 053322 (MBK).

Distribution. NE India, China, Thailand, Vietnam, Malaysia.

**Selaginella repanda** (Desv. ex Poir.) Spring in Gaudichaud, Voy. Bonite, Bot. 1: 329. 1844; Fl. Thailand 3: 22. 1979; Fl. China 2–3: 59. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 20 Jan. 2013, *Law Shine* 096458 (MBK); between Kanpetlet and Makyauk Ar village, ca. 1517 m, 3 Dec. 2012, *K. Fujikawa et al.* 090033 (MBK). MAGWAY REGION. Saw Township: Thee Kone village, ca. 304 m, 20 Nov. 2011, *Ling Shein Man* 087877A (MBK).

Distribution. India, Nepal, China, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, Philippines.

## Pteridophytes

### Equisetaceae Michx. ex DC.

**Equisetum diffusum** D. Don, Prodr. Fl. Nepal.: 19. 1825; Lindsay et al. in Thai Forest Bull., Bot. 37: 77. 2009; Fl. China 2–3: 68. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: in the vicinity of Kanpetlet, NMT NP, 6 Dec. 2008, *M. Matsumoto 080981* (MBK); Ma Kyauk Ah village, NMT NP, 27 Feb. 2007, *Shein Gay Ngai 051078* (MBK); 1 Sep. 2012, *M. Matsumoto 088485* (MBK); NMT NP, 3 Oct. 2012, *Law Shine 091597* (MBK); ca. 1750–1820 m, 10 Mar. 2002, *J. Murata et al. 022903* (MBK); along walking trail between Saw Loung village and Saw Chaung river (Saw river), 695–1375 m, 13 Dec. 2012, *K. Fujikawa et al. 090843* (MBK); 750–1375 m, 6 Sep. 2013, *K. Fujikawa et al. 095040* (MBK); Yelong Pan village, NMT NP, 2 Sep. 2012, *M. Matsumoto 088483* (MBK); along foot path and unpaved new car road between Kanpetlet and Yelong Pan village, NMT NP, 1260–1435 m, 23 Aug. 2013, *K. Fujikawa et al. 094336* (MBK); a traverse route between Kanpetlet and Yelong Pan village, ca. 1300 m, 6 Sep. 2012, *Ling Shein Man 091712* (MBK); between Kanpetlet and Yelong Pan village, NMT NP, 1445 m, 15 Sep. 2011, *H. Funakoshi et al. 085361* (MBK); roadside between Kanpetlet and Yelong Pan village, approximately 2 miles from Yelongpan village, NMT NP, 1504 m, 24 Feb. 2014, *P. Srisanga et al. 097230* (MBK); 1690 m, 2 Dec. 2012, *K. Fujikawa et al. 090450* (MBK); *090906* (MBK); northern side of Old town area, ca. 1828 m, 26 Nov. 2011, *Ling Shein Man 087914* (MBK). Mindat Township: along the Chi Chaung, NMT NP, ca. 741 m, 10 Dec. 2012, *K. Fujikawa et al. 090199* (MBK); Chi Chaung river, along the road between Kanpetlet and Mindat, 840 m, 16 Feb. 2012, *K. Fujikawa et al. 086775* (MBK); along the roadside between Mindat and Kanpetlet, NMT NP, 1065 m, 22 Mar. 2006, *K. Fujikawa & A. Nomachi 035865* (MBK); Hilong village, NMT NP, 1740 m, 5 Aug. 2008, *K. Fujikawa et al. 053133* (MBK). MAGWAY REGION. Saw Township: along the roadside between Kangyi and Saw, 470 m, 27 May 2012, *K. Fujikawa et al. 089348* (MBK).

Distribution. Pakistan, Nepal, Bhutan, NE India, China, Japan, Thailand, Laos, Vietnam.

**Equisetum ramosissimum** Desf. subsp. **debile** (Roxb. ex Vaucher) Hauke in Amer. Fern J. 52: 33. 1962; Fl. Thailand. 3: 34. 1979; Lindsay et al. in Thai Forest Bull., Bot. 37: 78. 2009; Fl. China 2–3: 70. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Mindat Township: Mindat area, NMT NP, 22 Oct. 2011, *Law Shine 088245* (MBK); along the roadside between Mindat and Kanpetlet, NMT NP, 1065 m, 22 Mar. 2006, *K. Fujikawa & A. Nomachi 035880* (MBK). MAGWAY REGION. Saw Township: near Saw, along the Saw river, 435 m, 19 Mar. 2006, *K. Fujikawa & A. Nomachi 035793* (MBK); around Annya Galen village, ca. 2 miles from Saw, north of Saw, 440 m, 12 Sep. 2013, *K. Fujikawa et al. 095480* (MBK).

Distribution. India, Nepal, Bangladesh, China, Japan, Thailand, Laos, Vietnam, Singapore, Malaysia, Indonesia, New Guinea, Philippines; S Pacific islands (Fiji, New Caledonia, New Hebrides).

### Ophioglossaceae Martinov

**Botrychium lanuginosum** Wall. ex Hook. & Grev., Icon. Filic. 1: t. 79. 1828; Ferns Burma: 118. 1946; Fl. Thailand 3: 39. 1979; Fl. China 2–3: 75. 2013.

— *Japonobotrychium lanuginosum* (Wall.) Nishida ex Tagawa in J. Jap. Bot. 33: 199. 1958; Fl. East. Himal: 453. 1966.

Specimens examined. CHIN STATE. Kanpetlet Township: between 2 miles from entrance of National Park and Old town village, NMT NP, 2065 m, 24 Aug. 2013, *K. Fujikawa et al. 094366* (MBK); along the trail to the top of Mt. Victoria, NMT NP, ca. 2750-3050 m, 3 Dec. 2002, *J. Murata et al. 024895* (MBK). Mindat Township: along unpaved road between 16 miles junction from Mindat and Lone Pang village, NMT NP, 2550 m, 1 Sep. 2013, *K. Fujikawa et al. 094877* (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, China, Thailand, Vietnam, Malaysia, Indonesia (Java, Sumatra), New Guinea, Philippines.

**Ophioglossum thermale** Kom. in Repert. Spec. Nov. Regni Veg. 13: 85. 1914; Fl. China 2–3: 79. 2013.

Specimens examined. MAGWAY REGION. Saw Township: near the border of Chin and Magway, along the roadside between Saw and Kanpetlet, 23 June 2009, *N. Tanaka & T. Yukawa 081075* (MBK).

Distribution. China, Korea, Japan, Russia (Kamchatka).

### Marattiaceae Kaulf.

**Angiopteris helferiana** C.Presl, Suppl. Tent. Pterid.: 22. 1845; Ferns Burma: 118. 1946; Fl. Thailand 3: 41. 1979; Fl. China 2–3: 87. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 1088 m, 20 Jan. 2013, *Law Shine 096448* (MBK).

Distribution. India, Nepal, Bhutan, China.

### Hymenophyllaceae Mart.

**Crepidomanes latealatum** (Bosch) Copel. in Philipp. J. Sci. 67: 60. 1938; Ferns Burma: 130. 1946; Fl. East. Himal.: 456. 1966; Fl. Thailand. 3: 89. 1979; Lindsay et al. in Thai Forest Bull., Bot. 37: 79. 2009; Fl. China 2–3: 97. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: road between Kanpetlet and Mindat, ca. 6 miles from Kanpetlet, NMT NP, 2300 m, 25 May 2007, *N. Kuroiwa et al. 051260* (MBK); NMT NP, 2320 m, 6 June 2002, *N. Tanaka et al. 023767* (MBK); *023768* (MBK); *023769* (MBK); 2415 m, 3 June 2002, *N. Tanaka et al. 023727* (MBK); road between Kanpetlet and Mindat, 6–8 miles from Kanpetlet, NMT NP, 2400 m, 26 May 2007, *N. Kuroiwa et al. 051305* (MBK); 6 miles from entrance of NMT NP, along unpaved road between Kanpetlet and 10 miles base camp of National Park, NMT NP, 2400 m, 21 Aug. 2013, *K. Fujikawa et al. 094167* (MBK).

Distribution. Sri Lanka, N India, Nepal, Bhutan, China, Japan, Thailand, Laos, Vietnam, Malaysia; Australia.

**Crepidomanes cf. minutum** (Blume) K.Iwats., J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 13: 524. 1985; Fl. China 2–3: 98. 2013.

Distribution. Sri Lanka, Nepal, NE India, China, Korea, Japan, Russia (Siberia), Thailand, Cambodia, Vietnam, Malaysia, Indonesia, Philippines; Africa, Australia, Pacific islands (Melanesia, Micronesia, Polynesia).

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Hymenophyllum badium** Hook. & Grev. in Icon. Filic. 1: t. 76. 1828; Fl. China 2–3: 101. 2013.

Distribution. Sri Lanka, India, Nepal, Bhutan, China, Japan, Vietnam, Malaysia.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Hymenophyllum exsertum** Wall. ex Hook. in Sp. Fil. 1: 109. 1844; Fl. Thailand. 3: 73. 1979; Fl. China 2–3: 102. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Mecodium exsertum* (Wall.) Copel. in Philipp. J. Sci. 67(1): 19. 1938; Ferns Burma: 130. 1946; Fl. East. Himal.: 457. 1966.

Specimens examined. CHIN STATE. Kanpetlet Township: Yelong Pan village, NMT NP, ca. 1500 m, 24 May 2008, *M. Matsumoto & T. Watanabe 080967* (MBK); ca. 13 miles from entrance of National Park, between Kanpetlet and Mindat seasonal road, NMT NP, 2610 m, 28 May 2012, *K. Fujikawa et al. 089436* (MBK); NMT NP, 2620 m, 7 June 2002, *N. Tanaka et al. 023786* (MBK).

Distribution. N India, Bhutan, China, Thailand, Laos, Cambodia, Vietnam, Malaysia.

**Hymenophyllum polyanthos** (Sw.) Sw. in J. Bot. (Schrader). 1800 (2): 102. 1801; Fl. Thailand 3:

70. 1979; Fl. China 2–3: 103. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaifers/> Retrieved Aug. 1, 2016.

— *Mecodium polyanthos* (Sw.) Copel. in Philipp. J. Sci. 67(1): 23. 1938; Ferns Burma: 130. 1946; Fl. East. Himal.: 457. 1966.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088476* (MBK); *088477* (MBK); road through park, walking along the road 1 mile to 7 miles from Park Office, NMT NP, 2474 m, 20 Feb. 2014, *P. Srisanga et al. 097010* (MBK); NMT NP, 2600 m, 7 June 2002, *N. Tanaka et al. 023787* (MBK).

Distribution. Tropical and subtropical regions worldwide.

### Lygodiaceae M.Roem.

**Lygodium flexuosum** (L.) Sw. in J. Bot. (Schrader). 1800 (2): 106. 1801; Ferns Burma: 118. 1946; Fl. East. Himal.: 455. 1966; Fl. Thailand 3: 62. 1979; Fl. China 2–3: 119. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaifers/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Matupi Township: between Panine village and Longdon village, NMT NP, 1289 m, 14 Mar. 2014, *P. Srisanga et al. 097997* (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, China, S Japan, Thailand, Laos, Vietnam, Malaysia, Philippines; Africa, Australia, Pacific islands.

**Lygodium salicifolium** C.Presl, Suppl. Tent. Pterid.: 102. 1845; Ferns Burma: 118. 1946; Fl. Thailand 3: 64. 1979; Fl. China 2–3: 121. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaifers/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: along foot path (short cut for villagers) between ca. 4 miles from Kanpetlet and Saw., 445-850 m, 29 Aug. 2013, *K. Fujikawa et al. 094687* (MBK); roadside on Kanpetlet to Saw road, approximately 4 miles from Kanpetlet, NMT NP, 747 m, 22 Feb. 2014, *P. Srisanga et al. 097142* (MBK). Mindat Township: along the roadside between Mindat and Kangyi, 900 m, 19 Feb. 2012, *K. Fujikawa et al. 086149* (MBK). MAGWAY REGION. Saw Township: around 4 miles from Saw, along the roadside between Saw and Kangyi, 500 m, 14 Feb. 2012, *K. Fujikawa et al. 086667* (MBK).

Distribution. India, Nepal, Bhutan, China, Thailand, Laos, Vietnam, Indonesia.

### Marsileaceae Mirb.



**Marsilea minuta** L., Mant. Pl. Altera. 308. 1771; Fl. China 2–3: 123. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: along the roadside between Kanpetlet and Saw, Saw Chaung river, NMT NP, 850 m, 4 Dec. 2002, *J. Murata et al. 025566* (MBK). MAGWAY REGION. Saw Township: around Annya Galen village, ca. 2 miles from Saw, north of Saw, 440 m, 12 Sep. 2013, *K. Fujikawa et al. 095479* (MBK); along the roadside between Kangyi and Saw, 454 m, 6 Aug. 2008, *K. Fujikawa et al. 053186* (MBK); near Kangyi village, along the roadside between Mindat and Kangyi, 480 m, 27 May 2012, *K. Fujikawa et al. 089330* (MBK).

Distribution. Paleotropics, plus sporadic introductions in the Americas and Caribbean (Brazil, Trinidad and Tobago, and SE United States).

### Dennstaedtiaceae Lotsy

**Microlepia firma** Mett. ex Kuhn in Linnaea. 36: 146. 1869; Ferns Burma: 131. 1946; Fl. Thailand 3: 116. 1979; Fl. China 2–3: 164. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 2450-2500 m, 12 Mar. 2002, *J. Murata et al. 022067* (MBK). Matupi Township: track off road, approximately 2 miles along track from Matupi to Palatwa, on right to Chan Pyang village, NMT NP, 1676 m, 11 Mar. 2014, *P. Srisanga et al. 097843* (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, China, Thailand.

**Microlepia platyphylla** (D.Don) J.Sm. in London J. Bot. 1: 427. 1842; Ferns Burma: 131. 1946; Fl. Thailand 3: 121. 1979; Fl. China 2–3: 160. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: along the stream in the valley, Yelong Pan village, NMT NP, 1330 m, 28 Feb. 2013, *S. Sangvirotjanaphat et al. 091116* (MBK); NMT NP, ca. 1611 m, 10 Mar. 2006, *H. Nagamasu et al. 035591* (MBK); along the roadside between Masatwi and Kanpetlet, 1900 m, 26 Dec. 2012, *Ling Shein Man 096023* (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, China, Thailand, Laos, Vietnam, Philippines.

**Microlepia trapeziformis** (Roxb.) Kuhn in Chaetopt. 347. 1882; Ferns Burma: 131. 1946; Fl. East. Himal.: 463. 1966; Fl. Thailand 3: 118. 1979; Fl. China 2–3: 165. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: Hkoug Htu village, NMT NP, 1700 m, 18 Jan. 2011, *M. Matsumoto 084076* (MBK); 4-8 miles from tentrance of National Park, between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, ca. 2200-2600 m, 29 May 2012, *K. Fujikawa et al. 089551* (MBK); along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2260 m, 11 Feb. 2012, *K. Fujikawa et al. 086025* (MBK); 2330 m, 12 Feb. 2012, *K. Fujikawa et al. 086033* (MBK); NMT NP, 2420 m, 3 June 2002, *N. Tanaka et al. 023719* (MBK); ca. 2464 m, 6 Mar. 2006, *H. Nagamasu et al. 035434*

(MBK); ca. 2500 m, 12 Mar. 2002, *J. Murata et al. 022037* (MBK); along the road between Kanpetlet and 16 miles base camp, NMT NP, 2600 m, 10 Dec. 2008, *M. Matsumoto 053579* (MBK); *053582* (MBK); northern side area of Natma Taung (Mt. Victoria), NMT NP, ca. 2743 m, 19 Nov. 2011, *Ling Shein Man 087860* (MBK). Mindat Township: around Mindat, NMT NP, 2000-2300 m, 2 Mar. 2004, *N. Kuroiwa et al. 030437* (MBK); between Ohn village and Lone Pan village, NMT NP, 2155 m, 6 Mar. 2014, *P. Srisanga et al. 097636* (MBK); track through forest from 16 miles basecamp to Hilong village joining up with main road from Mindat at around 14 miles walking back up to 16 miles basecamp, NMT NP, 2354 m, 4 Mar. 2014, *M. Norsaengsri et al. 097550* (MBK); along the roadside between Mindat and Matupi township (56 miles N of Mindat), NMT NP, ca. 2400-2500 m, 17 May 2004, *N. Tanaka et al. 030866* (MBK); along new road towards Maha Myaing village, NMT NP, 2526 m, 27 Feb. 2014, *P. Srisanga et al. 097327* (MBK).

Distribution. India, China, Thailand, Vietnam, Malaysia, Indonesia, Philippines.

***Pteridium revolutum*** (Blume) Nakai in Bot. Mag. (Tokyo) 39: 109. 1925; Fl. China 2–3: 150. 2013.

— *Pteridium aquilinum* (L.) Kuhn subsp. *wightianum* (J. Agard.) W.C. Shieh in Quart. J. Chin. Forest. 6(4): 98. 1973; Fl. East. Himal.: 465. 1966.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 1800-2750 m, 14 Mar. 2002, *J. Murata et al. 022959* (MBK); ca. 1847 m, 9 Mar. 2006, *H. Nagamasu et al. 035630* (MBK); 2455 m, 3 June 2002, *N. Tanaka et al. 023723* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053390* (MBK). Matupi Township: roadside on road from Matupi to Mindat, approximately 1 mile from Matupi walking down away from the town, NMT NP, 1019 m, 13 Mar. 2014, *P. Srisanga et al. 097943* (MBK).

Distribution. Widely distributed in tropical and subtropical regions of Asia; N Australia.

### Pteridaceae E.D.M. Kirchn.

***Adiantum capillus-veneris*** L., Sp. Pl. 2: 1096. 1753; Ferns Burma: 135. 1946; Fl. East. Himal.: 458. 1966; Fl. Thailand 3: 214. 1985; Fl. China 2–3: 249. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Matupi Township: Pong Thsala waterfall on Laemio river, approximately 3 miles from Tisawn village, NMT NP, 1283 m, 8 Mar. 2014, *P. Srisanga et al. 097648* (MBK).

Distribution. Widely distributed in temperate and tropical regions in Africa, America, Asia, Europe, Oceania.

***Adiantum edgeworthii*** Hook., Sp. Fil. 2: 14. 1851; Ferns Burma: 135. 1946; Fl. East. Himal.: 459.

1966; Fl. Thailand 3: 210. 1985; Fl. China 2–3: 243. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: between Kanpetlet and Makyauk Ar village, NMT NP, 1475 m, 27 Feb. 2013, *S. Sangvirotjanaphat et al. 091074* (MBK). Matupi Township: roadside between Matupi and Mindat, approximately 12 miles from Matupi walking downhill towards the Laemio river, NMT NP, 920 m, 12 Mar. 2014, *P. Srisanga et al. 097885* (MBK). MAGWAY REGION. Saw Township: Road between Kazunma and Saw, 319 m, 23 May 2007, *K. Fujikawa et al. 051173* (MBK); near Saw, along the roadside between Saw and Kazunma, 470 m, 9 Aug. 2008, *K. Fujikawa et al. 053321* (MBK).

Distribution. N India, Nepal, Bhutan, China, Japan, N Thailand, Vietnam, Malaysia, Philippines.

**Adiantum malesianum** J.Ghatak in Bull. Bot. Surv. India 5: 73. 1963; Fl. Thailand 3: 207. 1985; Fl. China 2–3: 241. 2013.

Specimens examined. CHIN STATE. Mindat Township: around Chi Chaung river (Chi river), NMT NP, 4 Mar. 2013, *M. Matsumoto 091236* (MBK).

Distribution. Sri Lanka, India, China, Thailand, Vietnam, Malaysia, Indonesia, Philippines; Pacific islands (Polynesia).

**Adiantum monochlamys** D.C.Eaton in Proc. Amer. Acad. Arts. 4: 110. 1858; Fl. China 2–3: 247. 2013; Thet et al. in Korean J. Pl. Taxon. 46: 286. 2016.

Specimens examined. CHIN STATE. Mindat Township: along the roadside between 56 miles point and Matupi, NMT NP, ca. 2400 m, 17 May 2004, *N. Tanaka et al. 030629* (MBK).

Distribution. China, Korea, Japan.

**Adiantum philippense** L., Sp. Pl. 2: 1094. 1753; Ferns Burma: 134. 1946; Fl. East. Himal.: 459. 1966; Fl. Thailand 3: 211. 1985; Fl. China 2–3: 242. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: near Kanpetlet, 30 July 2008, *K. Fujikawa et al. 053026* (MBK); along foot path (short cut for villagers) between ca. 4 miles from Kanpetlet and Saw., 445-850 m, 29 Aug. 2013, *K. Fujikawa et al. 094682* (MBK); Saw river, Saw Loung village, ca. 609 m, 9 Dec. 2011, *Ling Shein Man 087957* (MBK); between Kanpetlet and Kantar Yon village, 1200 m, 12 Sep. 2011, *H. Funakoshi et al. 085293* (MBK); along the trail between Kanpetlet and Yelong Pan village, 1262-1450 m, 1 June 2012, *K. Fujikawa et al. 089648* (MBK); along the walking trail between Kanpetlet and Yelong Pan village, 1480 m, 16 Jan. 2011, *K. Fujikawa et al. 084031* (MBK). MAGWAY REGION. Saw Township: along the roadside between Saw and Paynut village, ca. 450-500 m, 10 Dec. 2002, *J. Murata et al. 025263* (MBK); near Saw, along the roadside between Saw and Kazunma, 560 m, 9 Aug. 2008, *K. Fujikawa et al. 053298* (MBK).

Distribution. Pakistan, India, Nepal, Bhutan, China, Thailand, Laos, Vietnam, Malaysia,

Indonesia, Philippines; tropics and subtropics of Africa, Oceania.

**Antrophyum callifolium** Blume in Enum. Pl. Javae. 2: 111. 1828; Fl. China 2–3: 251. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: along the way to Yelong Pan village, NMT NP, 1230 m, 28 Feb. 2013, *S. Sangvirodjanaphat et al. 091121* (MBK).

Distribution. Sri Lanka, India, China, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, Philippines; Australia.

Note. This is a new record for Myanmar.

**Calciophilopteris ludens** (Wall. ex Hook.) Yesilyurt & H.Schneid. in Phytotaxa 7: 56. 2010.

— *Doryopteris ludens* (Wall.) J.Sm., Hist. Fil. 289. 1875; Ferns Burma: 133. 1946; Fl. China 2–3: 217. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Pteris ludens* Wall. ex Hook., Sp. Fil. 2: 210. 1858; Fl. Thailand 3: 197. 1985.

Specimens examined. CHIN STATE. Mindat Township: around Chi Chaung river (Chi river), 3 miles from Mindat, between Mindat and Kanpetlet mountain road, NMT NP, 740-1025 m, 10 Dec. 2012, *K. Fujikawa et al. 090747* (MBK); along the Chi Chaung, NMT NP, ca. 741 m, 10 Dec. 2012, *K. Fujikawa et al. 090196* (MBK).

Distribution. India, Nepal, Bangladesh, China, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, Philippines; Australia.

Reproductive mode. apogamous (32 spores/sporangium).

**Cheilanthes farinosa** (Forssk.) Kaulf in Mem. Foug., Gen. Filic. 153, pl 12B. 1850; Fl. Thailand 3: 203. 1979; Ferns Burma: 133. 1946; Fl. East. Himal.: 460. 1966.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088462* (MBK); roadside on Kanpetlet to Saw road, approximately 4 miles from Kanpetlet, NMT NP, 747 m, 22 Feb. 2014, *P. Srisanga et al. 097134* (MBK); between Kanpetlet and Saw, 830 m, 2 Sep. 2011, *H. Funakoshi et al. 085064* (MBK); ca. 2-4 miles from Kanpetlet, between Kanpetlet and Saw, 850-1450 m, 2 June 2012, *K. Fujikawa et al. 089674* (MBK); NMT NP, ca. 1500 m, 4 Sep. 2012, *Ling Shein Man 091678* (MBK); 2525 m, 8 June 2002, *N. Tanaka et al. 023799* (MBK); around Makyauk Ar village, NMT NP, 1520 m, 3 Dec. 2012, *K. Fujikawa et al. 090470* (MBK); along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2220 m, 11 Feb. 2012, *K. Fujikawa et al. 086538* (MBK). Mindat Township: around Chi Chaung river (Chi river), NMT NP, 4 Mar. 2013, *M. Matsumoto 091237* (MBK); along the roadside between Mindat and Kangyi, 840 m, 19 Feb. 2012, *K. Fujikawa et al. 086859* (MBK); between Ohn village and Lone Pan village, NMT NP, 2083 m, 6 Mar. 2014, *P. Srisanga et al. 097625* (MBK); along the walking trail between Hilong village and 14 miles junction from Mindat (Mindat-Matupi road), NMT NP, 2200 m, 24 May 2012, *K. Fujikawa et al. 089213* (MBK); *089220* (MBK); along the

roadside between Mindat and Matupi township (56 miles N of Mindat), NMT NP, ca. 2400-2500 m, 17 May 2004, *N. Tanaka et al. 030855* (MBK). Matupi Township: track off road, approximately 2 miles along track from Matupi to Palatwa, on right to Chan Pyang village, NMT NP, 1676 m, 11 Mar. 2014, *P. Srisanga et al. 097841* (MBK).

Distribution. Tropics or warmer regions in both the Old and New Worlds.

Reproductive mode. sexual (64 spores/sporangium).

Note. This species has large morphological characteristics in size and shape of lamina. However, the individuals had intermediate characteristics between several 'morphological types' were not hybrid which have abortive spores. This means *C. farinosa* is basically one 'biological species' (Yatabe et al. 2009) has large morphological variation.

**Cheilanthes tenuifolia** (Burm.f.) Sw., Syn. Fil. 129, 332. 1806; Ferns Burma: 133. 1946; Fl. East. Himal.: 460. 1966; Fl. Thailand 3: 201. 1985; Fl. China 2-3: 220. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: near Kanpetlet, 30 July 2008, *K. Fujikawa et al. 053019* (MBK).

Distribution. Sri Lanka, India, Nepal, China, Thailand, Laos, Cambodia, Vietnam, Malaysia; Australia, Oceania (including New Zealand).

**Coniogramme fraxinea** (D.Don) Fée ex Diels in Engler & Prantl, Nat. Pflanzenfam. 1(4): 262. 1899; Ferns Burma: 135. 1946; Fl. East. Himal.: 460. 1966; Lindsay et al. in Thai Forest Bull., Bot. 37: 92. 2009; Fl. China 2-3: 172. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053550* (MBK); NMT NP, ca. 1800-2750 m, 14 Mar. 2002, *J. Murata et al. 022949* (MBK); along the roadside between 3 and 7 miles from Kanpetlet to NMT NP, ca. 2133 m, 9 Jan. 2012, *Ling Shein Man 088139* (MBK); 4-8 miles from entrance of National Park, between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, ca. 2200-2600 m, 29 May 2012, *K. Fujikawa et al. 089549* (MBK); road through park, walking along the road 1 mile to 7 miles from Park Office, NMT NP, 2474 m, 20 Feb. 2014, *P. Srisanga et al. 097031* (MBK). Mindat Township: near Mindat, along the roadside between Mindat and Kangyi, 1310 m, 19 Feb. 2012, *K. Fujikawa et al. 086136* (MBK); along the roadside between Mindat and Matupi township (56 miles N of Mindat), NMT NP, ca. 2400-2500 m, 17 May 2004, *N. Tanaka et al. 030868* (MBK); along new road towards Maha Myaing village, NMT NP, 2526 m, 27 Feb. 2014, *P. Srisanga et al. 097330* (MBK). Matupi Township: track off road, approximately 2 miles along track from Matupi to Palatwa, on right to Chan Pyang village, NMT NP, 1676 m, 11 Mar. 2014, *P. Srisanga et al. 097816* (MBK).

Distribution. Pakistan, India, Nepal, China, Thailand, Laos, Vietnam, Malaysia, Indonesia, Philippines.

**Haplopteris amboinensis** (Fée) X.C.Zhang in Ann. Bot. Fenn. 40: 460. 2003; Fl. China 2-3: 253.

2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Vittaria amboinensis* Fée in Mém. Foug. 3: 14. 1851; Ferns Burma: 130. 1946.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053554* (MBK); trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088474* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053384* (MBK); along the roadside between 4 and 6 miles from Kanpetlet to Natma Taung (Mt. Victoria), NMT NP, 2340 m, 31 July 2008, *K. Fujikawa et al. 053044* (MBK); road between Kanpetlet and Mindat, 6–8 miles from Kanpetlet, NMT NP, 2400 m, 26 May 2007, *N. Kuroiwa et al. 051297* (MBK); NMT NP, 2495 m, 8 June 2002, *N. Tanaka et al. 023794* (MBK); 2630 m, 7 June 2002, *N. Tanaka et al. 023778* (MBK); 2750 m, 3 June 2002, *N. Tanaka et al. 023741* (MBK). Mindat Township: between Ohn village and Lone Pan village, NMT NP, 2155 m, 6 Mar. 2014, *P. Srisanga et al. 097640* (MBK); along the roadside between Mindat and Matupi township, NMT NP, ca. 2400–2600 m, 18 May 2004, *N. Tanaka et al. 030705* (MBK).

Distribution. N India, China, Japan, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia.

**Haplopteris flexuosa** (Fée) E.H.Crane in Syst. Bot. 22: 514. 1998; Fl. China 2–3: 255. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Vittaria flexuosa* Fée, Mém. Foug., 3. Hist. Vittar. 16. 1851; Ferns Burma: 129. 1946; Fl. East. Himal.: 499. 1966; Fl. Thailand 3: 225. 1985.

Specimens examined. CHIN STATE. Kanpetlet Township: Yelong Pan village, NMT NP, 24 May 2008, *M. Matsumoto & T. Watanabe 080961* (MBK); water resort area, near Kanpetlet, ca. 1844 m, 4 Jan. 2012, *Ling Shein Man 088095* (MBK); along the roadside between 3 and 7 miles from Kanpetlet to NMT NP, ca. 2133 m, 9 Jan. 2012, *Ling Shein Man 088137* (MBK); start at half way go down to foothill, NMT NP, 2330 m, 3 Mar. 2013, *S. Sangvirotjanaphat et al. 091221* (MBK); NMT NP, 2365 m, 3 June 2002, *N. Tanaka et al. 023711* (MBK); ca. 2500 m, 12 Mar. 2002, *J. Murata et al. 022039* (MBK); along the roadside between the Chin Village Resort and the entrance to the trail to the top of Mt. Victoria, NMT NP, ca. 2430–2540 m, 5 Dec. 2002, *J. Murata et al. 025015* (MBK); road through park, walking along the road 1 mile to 7 miles from Park Office, NMT NP, 2474 m, 20 Feb. 2014, *P. Srisanga et al. 097011A* (MBK); *097028* (MBK); ca. 13 miles from entrance of National Park, between Kanpetlet and Mindat seasonal road, NMT NP, 2610 m, 28 May 2012, *K. Fujikawa et al. 089391* (MBK); along unpaved road at 10–14 miles from entrance of National Park between Kanpetlet and Mindat road, NMT NP, 2680 m, 28 Aug. 2013, *K. Fujikawa et al. 094581* (MBK). Matupi Township: between Panine village and Longdon village, NMT NP, 1289 m, 14 Mar. 2014, *P. Srisanga et al. 097985* (MBK); road from Matupi to Palatwa, NMT NP, 1821 m, 10 Mar. 2014, *P. Srisanga et al. 097784* (MBK).

Distribution. Nepal, India (Sikkim), Bhutan, China, Korea, Japan, Thailand, Laos, Cambodia, Vietnam.

**Haplopteris taeniophylla** (Copel.) E.H.Crane in Syst. Bot. 22: 514. 1998; Fl. China 2–3: 253. 2013.

Distribution. China, Philippines.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Onychium japonicum** (Thunb.) Kunze var. **lucidum** (D.Don) Christ in Bull. Soc. Bot. France. 52 (Mém. 1): 60. 1905; Ferns Burma: 133. 1946; Fl. China 2–3: 215. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: Old Kanpetlet, NMT NP, 1 Mar. 2009, *M. Matsumoto 053585* (MBK); along the roadside between entrance of National Park and Hla Long Pan Road, NMT NP, 1920 m, 25 Feb. 2013, *S. Sangvirotjanaphat et al. 091001* (MBK); along the walking trail between 16 miles base camp of Natma Taung and summit of Natma Taung (Mt. Victoria), NMT NP, 2800–3000 m, 13 Aug. 2008, *K. Fujikawa et al. 053496* (MBK).

Distribution. Pakistan, India, Nepal, Bhutan, China, Vietnam.

**Onychium siliculosum** (Desv.) C.Chr., Index Filic.: 469. 1906; Ferns Burma: 133. 1946; Fl. East. Himal.: 464. 1966; Fl. Thailand 3: 195. 1985; Fl. China 2–3: 213. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 20 Jan. 2013, *Law Shine 096451* (MBK). Matupi Township: roadside on road from Matupi to Mindat, approximately between 3 and 4 miles from Matupi walking down away from the town, NMT NP, 910 m, 13 Mar. 2014, *P. Srisanga et al. 097963* (MBK).

Distribution. India, Nepal, Bhutan, Bangladesh, China, Thailand, Laos, Cambodia, Vietnam, Malaysia; Oceania.

**Paragymnopteris vestita** (Hook.) K.H.Shing in Indian Fern J. 10: 230. 1993; Fl. China 2–3: 236. 2013; Thet et al. in Korean J. Pl. Taxon. 46: 286. 2016.

— *Gymnopteris vestita* (Hook.) Underw. in Bull. Torrey Bot. Club 29: 627. 1902; Fl. Thailand 3: 193. 1985.

Distribution. Pakistan, India, Nepal, Bhutan, China, N Thailand.

Note. The species was reported by Thet Yu Nwe (2016) from Natma Taung NP.

**Pteris arisanensis** Tagawa in Acta Phytotax. Geobot. 5: 102. 1936; Fl. China 2–3: 206. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: along the trail between Kanpetlet and Yelong Pan village, 1262–1450 m, 1 June 2012, *K. Fujikawa et al. 089647* (MBK); Yelong Pan village, NMT NP, ca. 1400 m, 24 May 2008, *M. Matsumoto & T. Watanabe 080966* (MBK).

Distribution. Sri Lanka, India, Nepal, China, Thailand, Vietnam.

Reproductive mode. apogamous (32 spores/sporangium).

**Pteris aspericaulis** Wall. ex J. Agard. var. **aspericaulis**, Spec. Pter. 22. 1839; Fl. Thailand 3: 253. 1985; Lindsay et al. in Thai Forest Bull., Bot. 37: 93. 2009; Fl. China 2–3: 200. 2013.

— *Pteris aspericaulis* Wall., Numer. List: no. 107. 1820, nom. nud.; Ferns Burma: 134. 1946.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053551* (MBK); roadside between Kanpetlet and Yelong Pan village, NMT NP, 1510 m, 24 Feb. 2014, *P. Srisanga et al. 097253* (MBK); NMT NP, ca. 2500 m, 12 Mar. 2002, *J. Murata et al. 022036* (MBK); road between Kanpetlet and Mindat, 10–12 miles from Kanpetlet, NMT NP, 2677 m, 29 May 2007, *K. Fujikawa et al. 051401* (MBK). Mindat Township: along the trail between 12 miles from Mindat (Mindat-Matupi road) and Lone Pang village, NMT NP, 2554 m, 18 Feb. 2012, *K. Fujikawa et al. 086845* (MBK).

Distribution. N India, Nepal, Bhutan, China, Thailand.

Reproductive mode. apogamous (32 spores/sporangium).

**Pteris bella** Tagawa in Acta Phytotax. Geobot. 8: 166. 1939; Fl. Thailand 3: 250. 1985; Lindsay et al. in Thai Forest Bull., Bot. 37: 93. 2009; Fl. China 2–3: 206. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016. Thet et al. in Korean J. Pl. Taxon. 49: 9. 2019.

Specimens examined. CHIN STATE. Matupi Township: Pong Thsala waterfall on Laemio river, approximately 3 miles from Tisawn village, NMT NP, 1283 m, 8 Mar. 2014, *P. Srisanga et al. 097675* (MBK).

Distribution. China, Thailand, Vietnam.

Reproductive mode. sexual (64 spores/sporangium).

**Pteris biaurita** L., Sp. Pl. 2: 1076. 1753; Ferns Burma: 134. 1946; Fl. East. Himal.: 465. 1966; Fl. Thailand 3: 237. 1985; Fl. China 2–3: 204. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: near Saw Loung village, NMT NP, ca. 914 m, 10 Dec. 2011, *Ling Shein Man 087990* (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, Bangladesh, China, Thailand, Laos, Malaysia, Indonesia, Philippines; pantropical.

Reproductive mode. apogamous (32 spores/sporangium).



**Pteris cretica** L., Mant. Pl. 1: 130. 1767; Ferns Burma: 134. 1946; Fl. East. Himal.: 465. 1966; Fl. Thailand 3: 255. 1985; Fl. China 2–3: 191. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 1803 m, 6 Mar. 2006, *H. Nagamasu et al. 035442* (MBK); 5.5 miles point to valley along the trail to the top, NMT NP, 2100 m, 9 June 2002, *N. Tanaka et al. 023807* (MBK); 4–8 miles from entrance of National Park, between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, ca. 2200–2600 m, 29 May 2012, *K. Fujikawa et al. 089550* (MBK); along the roadside between 3 and 7 miles from Kanpetlet to NMT NP, ca. 2286 m, 9 Jan. 2012, *Ling Shein Man 088146* (MBK); along the roadside between 4 and 6 miles from Kanpetlet to Natma Taung (Mt. Victoria), NMT NP, 2340 m, 31 July 2008, *K. Fujikawa et al. 053038* (MBK); road through park, walking along the road 1 mile to 7 miles from Park Office, NMT NP, 2474 m, 20 Feb. 2014, *P. Srisanga et al. 097027* (MBK); NMT NP, ca. 2500 m, 12 Mar. 2002, *J. Murata et al. 022038* (MBK). Mindat Township: between Ohn village and Lone Pan village, NMT NP, 2155 m, 6 Mar. 2014, *P. Srisanga et al. 097630* (MBK).

Distribution. Pakistan, Sri Lanka, India, Nepal, Bhutan, China, Japan, Thailand, Laos, Cambodia, Vietnam, Philippines; Africa, SW Asia, Europe, Pacific islands (Fiji, Hawaii).

Reproductive mode. apogamous (32 spores/sporangium).

**Pteris esquirolii** Christ in Notul. Syst. (Paris) 1: 50. 1909; Ferns Burma: 134. 1946; Fl. China 2–3: 192. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 9 June 2002, *N. Tanaka et al. 023814* (MBK).

Distribution. China, N Vietnam.

Reproductive mode. sexual (64 spores/sporangium).

**Pteris fauriei** Hieron. s.l. in Hedwigia. 55: 345. 1914; Ferns Burma: 134. 1946; Fl. China 2–3: 204. 2013.

— *Pteris linearis* Poir. var. *fauriei* (Hieron.) C. Chr. & Tardieu, Fl. Indo-Chine 7(2): 159. 1939; Fl. Thailand 3: 239. 1985.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 1650–1800 m, 8 Mar. 2002, *J. Murata et al. 022869* (MBK); ca. 1800–2750 m, 14 Mar. 2002, *J. Murata et al. 022945* (MBK); 2305 m, 6 June 2002, *N. Tanaka et al. 023765* (MBK); 2410 m, 3 June 2002, *N. Tanaka et al. 023712* (MBK); ca. 2464 m, 6 Mar. 2006, *H. Nagamasu et al. 035435* (MBK); ca. 2500 m, 12 Mar. 2002, *J. Murata et al. 022040* (MBK); along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2030 m, 11 Feb. 2012, *K. Fujikawa et al. 086527* (MBK); along the roadside between 3 and 7 miles from Kanpetlet to NMT NP, ca. 2286 m, 9 Jan. 2012, *Ling Shein Man 088156* (MBK). Mindat Township: Mindat area, NMT NP, 18 Apr. 2012, *Law Shine 088405* (MBK); along new road towards Maha Myaing village, NMT NP,

2526 m, 27 Feb. 2014, *P. Srisanga et al.* 097339 (MBK).

Distribution. China, Japan, N Vietnam.

Reproductive mode. apogamous (32 spores/sporangium) or sexual (64 spores/sporangium).

Note. Future study needs to check whether apogamous type and sexual type are same species or different species.

**Pteris longipes** D.Don, Prodr. Fl. Nepal.: 15–16. 1825; Fl. Thailand 3: 235. 1985; Fl. China 2–3: 206. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 1800–2750 m, 14 Mar. 2002, *J. Murata et al.* 022944 (MBK); along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2030 m, 11 Feb. 2012, *K. Fujikawa et al.* 086511 (MBK); 086521 (MBK). Matupi Township: track off road, approximately 2 miles along track from Matupi to Palatwa, on right to Chan Pyang village, NMT NP, 1676 m, 11 Mar. 2014, *P. Srisanga et al.* 097842 (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, China, Thailand, Vietnam, Indonesia, Philippines.

**Pteris puberula** Ching in Bull. Fan Mem. Inst. Biol., Bot. 11: 52. 1941; Fl. China 2–3: 205. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: along the roadside between 3 and 7 miles from Kanpetlet to NMT NP, ca. 2133 m, 9 Jan. 2012, *Ling Shein Man* 088138 (MBK); along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2340 m, 12 Feb. 2012, *K. Fujikawa et al.* 086037 (MBK); NMT NP, ca. 2500 m, 12 Mar. 2002, *J. Murata et al.* 022033 (MBK); 2540 m, 8 June 2002, *N. Tanaka et al.* 023797 (MBK); ca. 2826 m, 5 Mar. 2006, *H. Nagamasu et al.* 035362 (MBK); ca. 2850 m, 9 Mar. 2002, *J. Murata et al.* 022897 (MBK); along the walking trail between 16 miles base camp of Natma Taung and summit of Natma Taung (Mt. Victoria), NMT NP, 2800–3000 m, 13 Aug. 2008, *K. Fujikawa et al.* 053494 (MBK).

Distribution. India, Nepal, Bhutan, China.

Reproductive mode. sexual (64 spores/sporangium).

**Pteris terminalis** Wall. ex J.Agard., Recens. Spec. Pter. 20. 1839; Fl. China 2–3: 197. 2013.

— *Pteris excelsa* Gaud., Voy. Uranie 388. 1827; Ferns Burma: 134. 1946; Fl. Thailand 3: 248. 1985.

Specimens examined. CHIN STATE. Kanpetlet Township: between Kanpetlet and Kantar Yon village, 1200 m, 12 Sep. 2011, *H. Funakoshi et al.* 085294 (MBK).

Distribution. Pakistan, N. India, Nepal, China, S Korea, Japan, Thailand, Laos, Vietnam,

Malaysia, Philippines; Pacific islands (Fiji, Hawaii).

**Pteris tripartita** Sw. in J. Bot. (Schrader) 1800: 67. 1801; Fl. Thailand 3: 237. 1985; Fl. China 2–3: 210. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016; Thet et al. in Korean J. Pl. Taxon. 46: 286. 2016.

Distribution. Sri Lanka, India, China, Thailand, Laos, Vietnam, Malaysia, Indonesia, Philippines; Africa, Australia, Madagascar, Pacific islands (Polynesia), South America (Brazil).

Note. The species was reported by Thet Yu Nwe et al. (2016) from Natma Taung NP.

**Pteris vittata** L., Sp. Pl. 2: 1074. 1753; Ferns Burma: 134. 1946; Fl. East. Himal.: 467. 1966; Fl. Thailand 3: 233. 1985; Fl. China 2–3: 193. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: near Saw Loung village, ca. 609 m, 9 Dec. 2011, *Ling Shein Man 087968* (MBK); along walking trail between Saw Loung village and Saw Chaung river (Saw river), 695-1375 m, 13 Dec. 2012, *K. Fujikawa et al. 090836* (MBK). Mindat Township: Chi Chaung river, along the road between Kanpetlet and Mindat, 840 m, 16 Feb. 2012, *K. Fujikawa et al. 086774* (MBK); along the roadside between Mindat and Kangyi, 900 m, 19 Feb. 2012, *K. Fujikawa et al. 086147* (MBK). Matupi Township: approximately 19 miles from Matupi on road to N. Chin State, NMT NP, 1526 m, 9 Mar. 2014, *P. Srisanga et al. 097759* (MBK).

Distribution. Widely distributed in tropics and subtropics of the Old World.

Reproductive mode. sexual (64 spores/sporangium).

**Pteris wallichiana** J. Agardh, Recens. Spec. Pter. 69. 1839; Ferns Burma: 134. 1946; Fl. East. Himal.: 467. 1966; Fl. Thailand 3: 236. 1985; Fl. China 2–3: 209. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: along the roadside between the Chin Village Resort and the entrance to the trail to the top of Mt. Victoria, NMT NP, ca. 2430-2540 m, 5 Dec. 2002, *J. Murata et al. 025013* (MBK); NMT NP, 2495 m, 8 June 2002, *N. Tanaka et al. 023791* (MBK).

Distribution. India, Nepal, Bhutan, China, Japan, Thailand, Laos, Vietnam, Malaysia, Indonesia, Philippines.

Reproductive mode. sexual (64 spores/sporangium).

### Cystopteridaceae Shmakov

**Acystopteris tenuisecta** (Blume) Tagawa in Acta Phytotax. Geobot. 7: 73. 1938.

— *Cystopteris tenuisecta* (Blume) Mett. in Ann. Mus. Bot. Lugduno-Batavi 1(8): 241. 1864; Ferns Burma: 137. 1946; Fl. East. Himal.: 473. 1966.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 2450-2500 m, 12 Mar. 2002, *J. Murata et al. 022049* (MBK).

Distribution. Nepal, Bhutan, NE India, China, Indonesia, S Japan, Thailand, Vietnam, Singapore, Malaysia, Philippines; New Zealand.

### Aspleniaceae Newman

**Asplenium aethiopicum** (Burm.f.) Bech. in Candollea 6: 23. 1935; Fl. China 2–3: 287. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: Makyauk Ar village area, ca. 1371 m, 24 Dec. 2011, *Ling Shein Man 088077* (MBK); around Makyauk Ar village, NMT NP, 1520 m, 3 Dec. 2012, *K. Fujikawa et al. 090475* (MBK); Oak Pho village, NMT NP, 1525 m, 3 Dec. 2008, *M. Matsumoto 053543* (MBK); Old town village, NMT NP, ca. 2000 m, 3 Oct. 2012, *Ling Shein Man 091773* (MBK); road between Kanpetlet and Mindat, ca. 6 miles from Kanpetlet, NMT NP, 2300 m, 24 May 2007, *N. Kuroiwa et al. 051217* (MBK).

Distribution. India, China, Thailand, Vietnam, Malaysia, Indonesia, Philippines; tropical Africa, tropical America, Australia, Macaronesia, Pacific islands (Hawaii).

Reproductive mode. sexual (64 spores/sporangium).

**Asplenium ensiforme** Wall. ex Hook. & Grev., Icon. Filic. 1: t. 71. 1828; Ferns Burma: 124. 1946; Fl. East. Himal.: 487. 1966; Fl. Thailand 3: 266. 1985; Fl. China 2–3: 274. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053824* (MBK); trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088463* (MBK); Yelong Pan village, NMT NP, ca. 1500 m, 24 May 2008, *M. Matsumoto & T. Watanabe 080965* (MBK); between 2 miles from entrance of National Park and Old town village, NMT NP, 2065 m, 24 Aug. 2013, *K. Fujikawa et al. 094382* (MBK); along the roadside between 3 and 7 miles from Kanpetlet to NMT NP, ca. 2133 m, 9 Jan. 2012, *Ling Shein Man 088131* (MBK); NMT NP, 2215 m, 6 June 2002, *N. Tanaka et al. 023772* (MBK); ca. 2450-2500 m, 12 Mar. 2002, *J. Murata et al. 022056* (MBK); 2495 m, 8 June 2002, *N. Tanaka et al. 023793* (MBK); 2585 m, 7 June 2002, *N. Tanaka et al. 023783* (MBK); 023784 (MBK); 2675 m, 3 June 2002, *N. Tanaka et al. 023754* (MBK); 2780 m, 3 June 2002, *N. Tanaka et al. 023755* (MBK); 2980 m, 3 June 2002, *N. Tanaka et al. 023756* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053387* (MBK); along the roadside between 4 and 6 miles from Kanpetlet to Natma Taung (Mt. Victoria), NMT NP,

2340 m, 31 July 2008, *K. Fujikawa et al. 053042* (MBK); road between Kanpetlet and Mindat, 6-8 miles from Kanpetlet, NMT NP, 2400 m, 26 May 2007, *N. Kuroiwa et al. 051296* (MBK); road through park, walking along the road 1 mile to 7 miles from Park Office, NMT NP, 2474 m, 20 Feb. 2014, *P. Srisanga et al. 097011B* (MBK); along the trail to the peak of Mt. Victoria, NMT NP, ca. 2700-3050 m, 3 Dec. 2002, *J. Murata et al. 024586* (MBK); along the road to the entrance of the trail to the peak of Mt. Victoria, NMT NP, ca. 2750 m, 28 June 2009, *N. Tanaka & T. Yukawa 081370* (MBK); along the roadside between Mt. Victoria and Mindat, NMT NP, 2750-2500 m, 3 Dec. 2002, *J. Murata et al. 025509* (MBK); along the walking trail between 16 miles base camp of Natma Taung and summit of Natma Taung (Mt. Victoria), NMT NP, 2900 m, 13 Aug. 2008, *K. Fujikawa et al. 053499* (MBK). Mindat Township: between Ohn village and Lone Pan village, NMT NP, 2155 m, 6 Mar. 2014, *P. Srisanga et al. 097632* (MBK); 21 miles toward Madupi from Mindat, 2355 m, 9 Sep. 2011, *H. Funakoshi et al. 085245* (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, China, Japan, Thailand, Laos, Vietnam.

Reproductive mode. sexual (64 spores/sporangium).

**Asplenium indicum** Sledge in Bull. Brit. Mus. (Nat. Hist.), Bot. 3: 264. 1965; Fl. East. Himal.: 487. 1966; Fl. Thailand 3: 285. 1985; Fl. China 2-3: 286. 2013.

— *Asplenium planicaule* Wall., Numer. List: no. 189. 1829, nom. nud.; Ferns Burma: 125. 1946.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088471* (MBK); Yelong Pan village, NMT NP, ca. 1500 m, 24 May 2008, *M. Matsumoto & T. Watanabe 080969* (MBK); around Makyauk Ar village, NMT NP, 1520 m, 3 Dec. 2012, *K. Fujikawa et al. 090475A* (MBK); 6 miles from Kanpetlet to NMT NP, ca. 2194 m, 9 Jan. 2012, *Ling Shein Man 088164* (MBK); 4-8 miles from entrance of National Park, between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, ca. 2200-2600 m, 29 May 2012, *K. Fujikawa et al. 089523* (MBK); road between Kanpetlet and Mindat, ca. 6 miles from Kanpetlet, NMT NP, 2300 m, 24 May 2007, *N. Kuroiwa et al. 051217A* (MBK); NMT NP, 2315 m, 3 June 2002, *N. Tanaka et al. 023737* (MBK); 2370 m, 3 June 2002, *N. Tanaka et al. 023706* (MBK); 2425 m, 3 June 2002, *N. Tanaka et al. 023725* (MBK); 2495 m, 8 June 2002, *N. Tanaka et al. 023792* (MBK); 2585 m, 7 June 2002, *N. Tanaka et al. 023779* (MBK); along the roadside between 4 and 6 miles from Kanpetlet to Natma Taung (Mt. Victoria), NMT NP, 2340 m, 31 July 2008, *K. Fujikawa et al. 053039* (MBK); road between Kanpetlet and Mindat, ca. 18 miles from Kanpetlet, NMT NP, 2373 m, 21 Feb. 2007, *K. Fujikawa et al. 050068* (MBK); road between Kanpetlet and Mindat, 6-8 miles from Kanpetlet, NMT NP, 2400 m, 26 May 2007, *N. Kuroiwa et al. 051284* (MBK); 6 miles from entrance of NMT NP, along unpaved road between Kanpetlet and 10 miles base camp of National Park, NMT NP, 2400 m, 21 Aug. 2013, *K. Fujikawa et al. 094135* (MBK); road through park, walking along the road 1 mile to 7 miles from Park Office, NMT NP, 2474 m, 20 Feb. 2014, *P. Srisanga et al. 097023* (MBK). Mindat Township: along the roadside Hilon village, Mindat, the NMT NP, ca. 2300-2500 m, 28 Apr. 2003, *J. Murata et al. 029260* (MBK); along the roadside between Mindat and Matupi township (56 miles N of Mindat), NMT NP, ca. 2400-2500 m, 17 May 2004, *N. Tanaka et al. 030865* (MBK); along the roadside between Mindat and Matupi township, NMT NP, ca. 2400-2600 m, 18 May 2004, *N. Tanaka et al. 030700* (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, China, Thailand, Vietnam, Philippines.

Reproductive mode. sexual (64 spores/sporangium).

**Asplenium tenuifolium** D.Don, Prodr. Fl. Nepal.: 8. 1825; Ferns Burma: 125. 1946; Fl. East. Himal.: 488. 1966; Fl. Thailand 3: 274. 1985; Fl. China 2–3: 295. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088465* (MBK); along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2030 m, 11 Feb. 2012, *K. Fujikawa et al. 086524* (MBK); along the roadside between 3 and 7 miles from Kanpetlet to NMT NP, ca. 2286 m, 9 Jan. 2012, *Ling Shein Man 088154* (MBK); NMT NP, 2315 m, 6 June 2002, *N. Tanaka et al. 023766* (MBK); 2420 m, 3 June 2002, *N. Tanaka et al. 023722* (MBK); ca. 2450–2500 m, 12 Mar. 2002, *J. Murata et al. 022048* (MBK); *022054* (MBK); 2640 m, 7 June 2002, *N. Tanaka et al. 023777* (MBK); along the roadside between 4 and 6 miles from Kanpetlet to Natma Taung (Mt. Victoria), NMT NP, 2340 m, 31 July 2008, *K. Fujikawa et al. 053047* (MBK); road between Kanpetlet and Mindat, ca. 18 miles from Kanpetlet, NMT NP, 2373 m, 21 Feb. 2007, *K. Fujikawa et al. 050069* (MBK); ca. 13 miles from entrance of National Park, between Kanpetlet and Mindat seasonal road, NMT NP, 2610 m, 28 May 2012, *K. Fujikawa et al. 089447* (MBK); road between Kanpetlet and Mindat, 10–12 miles from Kanpetlet, NMT NP, 2677 m, 29 May 2007, *K. Fujikawa et al. 051391* (MBK); northern side area of Natma Taung (Mt. Victoria), NMT NP, ca. 2743 m, 19 Nov. 2011, *Ling Shein Man 087861* (MBK).

*Distribution.* Sri Lanka, India, Nepal, Bhutan, China, Thailand, Vietnam, Malaysia, Indonesia, Philippines.

**Asplenium yoshinagae** Makino in Phan. Pter. Jap. Icon. t. 64. 1900; Fl. China 2–3: 286. 2013.

Distribution. India, China, Japan, Vietnam.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Hymenasplenium excisum** (C.Presl) S.Linds. in Thai Forest Bull., Bot. 37: 69. 2009; Fl. China 2–3: 314. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Asplenium excisum* C.Presl, Epimel. Bot.: 74. 1851; Fl. Thailand 3: 278. 1985.

— *Asplenium unilaterale* Lam. var. *rahaoense* (Hayata) Hayata, Gen. Index Fl. Formosa 103. 1917; Ferns Burma: 125. 1946.

Specimens examined. CHIN STATE. Mindat Township: Mindat area, NMT NP, 22 Oct. 2011, *Law Shine 088254* (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, China, Thailand, Laos, Vietnam, Malaysia, Indonesia, Philippines; tropical Africa.

Reproductive mode. sexual (64 spores/sporangium).

**Hymenasplenium retusulum** (Ching) Viane & S.Y.Dong, Fl. China 2–3: 311. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2030 m, 11 Feb. 2012, *K. Fujikawa et al. 086523* (MBK); 5 miles from Kanpetlet to NMT NP, ca. 2133 m, 9 Jan. 2012, *Ling Shein Man 088160* (MBK); NMT NP, 2215 m, 6 June 2002, *N. Tanaka et al. 023771* (MBK); *023773* (MBK); 2230 m, 6 June 2002, *N. Tanaka et al. 023770* (MBK); ca. 2450–2500 m, 12 Mar. 2002, *J. Murata et al. 022055* (MBK); *022062* (MBK). Mindat Township: along the trail between 12 miles from Mindat (Mindat-Matupi road) and Lone Pang village, NMT NP, 2554 m, 18 Feb. 2012, *K. Fujikawa et al. 086848* (MBK).

Distribution. China.

Reproductive mode. sexual (64 spores/sporangium).

Note. Murakami et al. (1998) referred to morphological variation in *H. obliquissimum* sensu lato, ‘thin laminae type’ and ‘thicker laminae type’. Thin laminae type was a monophyletic group in the plastid gene *rbcL* phylogeny, but thicker laminae type which contain several species in southern Yunnan in China (*H. changputungense*, *H. furfuraceum*, *H. latidens*, *H. quercicola*, *H. retusulum*, *H. szechuanense*, Ching 1965) was paraphyletic and they shared the haplotypes of *rbcL* and morphological variation although taxon sampling from each type localities (Murakami et al. unpublished). Therefore, it is reasonable to treat these species as one species, *H. retusulum*, Ching (1965) firstly described in the article.

This is a new record for Myanmar.

### **Thelypteridaceae Ching ex Pic.Serm.**

**Cyclosorus articulatus** (Houlston & T.Moore) Panigrahi in Res. J. Pl. Environ. 9: 66. 1993; Fl. China 2–3: 381. 2013.

— *Thelypteris articulata* (Houlston & T.Moore) Tagawa & K.Iwats. in Acta Phytotax. Geobot. 26: 169. 1975; Fl. Thailand 3: 406. 1988.

Specimens examined. CHIN STATE. Kanpetlet Township: Yelong Pan village, NMT NP, 1371 m, 15 Jan. 2012, *Ling Shein Man 088223* (MBK); roadside between Kanpetlet and Yelong Pan village, NMT NP, 1575 m, 24 Feb. 2014, *P. Srisanga et al. 097298* (MBK).

Distribution. Sri Lanka, India, China, Thailand, Vietnam.

**Cyclosorus dentatus** (Forssk.) Ching in Bull. Fan Mem. Inst. Biol., Bot. 8: 206. 1938; Fl. China 2–3: 377. 2013.

— *Thelypteris dentata* (Forssk.) E.P.St.John in Aemr. Fern J. 26: 44. 1936; Fl. Thailand 3: 427. 1988.

Specimens examined. CHIN STATE. Kanpetlet Township: ca. 2-4 miles from Kanpetlet, between Kanpetlet and Saw, 850-1450 m, 2 June 2012, *K. Fujikawa et al. 089673* (MBK); NMT NP, ca. 1566 m, 10 Mar. 2006, *H. Nagamasu et al. 035601* (MBK); ca. 1611 m, 10 Mar. 2006, *H. Nagamasu et al. 035617* (MBK); ca. 1750-1820 m, 10 Mar. 2002, *J. Murata et al. 022913* (MBK).

Distribution. China, Japan, tropical and subtropical Asia; N Africa, tropical America.

**Cyclosorus procerus** (D.Don) S.Linds. & D.J.Middl. in *Nordic J. Bot.* 30: 308. 2012; *Fl. China* 2–3: 379. 2013.

Distribution. N India, Nepal, Bhutan, Thailand.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP as “*Christella procera* (D.Don) Mazumdar”.

**Cyclosorus truncatus** (Poir.) Farwell in *Amer. Midl. Naturalist.* 12: 259. 1931; *Ferns Burma*: 123. 1946; *Fl. China* 2–3: 374. 2013; Lindsay & Middleton, *Ferns of Thailand, Laos and Cambodia*. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Thelypteris truncata* (Poir.) K.Iwats. in *Mem. Coll. Sci. Kyoto Imp. Univ., Ser. B, Biol.* 31: 33. 1964; *Fl. Thailand* 3: 420. 1988.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 9 June 2002, *N. Tanaka et al. 023808* (MBK); around Kanpetlet, 2200 m, 29 Dec. 2012, *Ling Shein Man 096024* (MBK). Mindat Township: around Mindat, NMT NP, 2000-2300 m, 2 Mar. 2004, *N. Kuroiwa et al. 030432* (MBK).

Distribution. Sri Lanka, India, China, Japan, Thailand, Laos, Vietnam, Malaysia, Indonesia, Philippines; N Australia, Pacific islands (Polynesia).

**Glaphyopteridopsis erubescens** (Wall. ex Hook.) Ching, in *Acta Phytotax. Sin.* 8: 320. 1963. *Fl. China* 2–3: 357. 2013.

Distribution. Pakistan, N India, Nepal, Bhutan, China, S Japan, N Vietnam, Philippines.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Macrothelypteris ornata** (Wall. ex J.Sm.) Ching in *Acta Phytotax. Sin.* 8: 309. 1963; *Fl. China* 2–3: 339. 2013.

— *Thelypteris ornata* (Wall. ex Bedd.) Ching in *Bull. Fan. Mem. Inst. Biol. Bot.* 6: 346. 1936; *Ferns Burma*. 122. 1946; *Fl. East. Himal.*: 488. 1966; *Fl. Thailand* 3: 396. 1988.

Specimens examined. CHIN STATE. Kanpetlet Township: along the trail between Kanpetlet and Yelong Pan village, 1262-1450 m, 13 Feb. 2012, *K. Fujikawa et al. 086633* (MBK).

Distribution. India, Nepal, Bhutan, China, Thailand.



**Macrothelypteris torresiana** (Gaud.) Ching in Acta Phytotax. Sin. 8: 310. 1963; Fl. China 2–3: 341. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 9 June 2002, *N. Tanaka et al.* 023809 (MBK).

Distribution. India, Nepal, Bhutan, China, Japan, Thailand, Laos, Vietnam, Indonesia, Philippines; tropical and subtropical regions of America, Australia, Pacific islands.

**Pronephrium nudatum** (Roxb.) Holttum in Blumea 20: 111. 1972; Fl. China 2–3: 393. 2013.

— *Cyclosorus nudatus* (Roxb.) B.K.Nayar & S.Kaur, Companion Handb. Ferns Brit. India 66, 69. 1974; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Thelypteris nudata* (Roxb.) C.V.Morton in Contr. U.S. Natl. Herb. 38: 352. 1974; Fl. Thailand 3: 411. 1988.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto* 053544 (MBK).

Distribution. N India, Nepal, Bhutan, China, Thailand, Vietnam, Indonesia, Philippines.

**Pseudocyclosorus tylodes** (Kunze) Ching in Acta Phytotax. Sin. 8: 323. 1963; Fl. China 2–3: 362. 2013.

— *Thelypteris tylodes* (Kuntze) Ching. in Bull. Fan Mem. Inst. Biol. Bot. 6: 296. 1936; Ferns Burma: 122. 1946 [“*xyloides*”]; Fl. East. Himal.: 488. 1966 [“*xyloides*”]; Fl. Thailand 3: 421. 1988.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto* 053546 (MBK); NMT NP, ca. 1500 m, 4 Sep. 2012, *Ling Shein Man* 091672 (MBK); ca. 1750–1820 m, 10 Mar. 2002, *J. Murata et al.* 022902 (MBK); ca. 2300–2450 m, 4 June 2002, *N. Tanaka et al.* 023301 (MBK); 023302 (MBK).

Distribution. Sri Lanka, India, China, N Thailand, Vietnam, N Philippines.

### Athyriaceae Alston

**Anisocampium cumingianum** C.Presl in Epimel. Bot. 59. 1851; Fl. China 2–3: 448. 2013.

Distribution. Sri Lanka, S India, China, Laos, Indonesia (Java), Philippines.

Note. The species was reported by Phyo Kay Khine et al. (2017) from Natma Taung NP as “*Athyrium cumingianum* (C.Presl) Ching”.

**Anisocampium cuspidatum** (Bedd.) Yea C.Liu, W.L.Chiou & M.Kato in *Taxon* 60: 829. 2011; *Fl. China* 2–3: 449. 2013; Hwang et al. in *Korean J. Pl. Taxon.* 45: 111. 2015.

— *Kuniwatsukia cuspidata* (Bedd.) Pic.Serm. in *Webbia* 28: 455. 1973; *Fl. Thailand* 3: 442. 1988.

Specimens examined. CHIN STATE. Kanpetlet Township: along the roadside between Kanpetlet and Saw, 606 m, 9 Aug. 2008, *K. Fujikawa et al. 053285* (MBK).

Distribution. W Himalaya, N India, Nepal, Bhutan, China, N Thailand, Laos.

**Athyrium anisopterum** Christ in *Bull. Herb. Boissier* 6: 962. 1898; *Fl. China* 2–3: 464. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088472* (MBK); northern side of Old town area, ca. 1828 m, 26 Nov. 2011, *Ling Shein Man 087925* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053398* (MBK); along the roadside between 4 and 6 miles from Kanpetlet to Natma Taung (Mt. Victoria), NMT NP, 2340 m, 31 July 2008, *K. Fujikawa et al. 053043* (MBK); NMT NP, 2415 m, 3 June 2002, *N. Tanaka et al. 023718* (MBK); ca. 2450-2500 m, 12 Mar. 2002, *J. Murata et al. 022057* (MBK); along the roadside between the Chin Village Resort and the entrance to the trail to the top of Mt. Victoria, NMT NP, ca. 2430-2540 m, 5 Dec. 2002, *J. Murata et al. 025014* (MBK); along the road between Kanpetlet and 16 miles base camp, NMT NP, 2600 m, 10 Dec. 2008, *M. Matsumoto 053575* (MBK); along the walking trail between 16 miles base camp of Natma Taung and summit of Natma Taung (Mt. Victoria), NMT NP, 2800-3000 m, 13 Aug. 2008, *K. Fujikawa et al. 053495* (MBK).

Distribution. Sri Lanka, India, Nepal, China, Thailand, Vietnam, Malaysia, Indonesia, Philippines.

**Athyrium atkinsonii** Beddome in *Suppl. Ferns S. Ind.* 11. 1876; *Fl. China* 2–3: 496. 2013.

Distribution. N Pakistan, N India, Nepal, Bhutan, China, S Korea, Japan.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Athyrium biserrulatum** Christ in *Bull. Acad. Int. Géogr. Bot.* 17: 135-136. 1907; *Fl. China* 2–3: 459. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053397* (MBK); along the walking trail between 16 miles base camp of Natma Taung and summit of Natma Taung (Mt. Victoria), NMT NP, 2800-3000 m, 13 Aug. 2008, *K. Fujikawa et al. 053497* (MBK).

Distribution. Pakistan, N India, Nepal, Bhutan, China.

**Athyrium dissitifolium** (Baker) C.Chr. in *Contr. U.S. Natl. Herb.* 26: 296. 1931; *Ferns Burma:*

123. 1946; Fl. Thailand 3: 446. 1988; Fl. China 2–3: 458. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053556* (MBK); Yelong Pan village, NMT NP, 1371 m, 15 Jan. 2012, *Ling Shein Man 088224* (MBK); NMT NP, ca. 1650-1800 m, 8 Mar. 2002, *J. Murata et al. 022862* (MBK); ca. 1803 m, 6 Mar. 2006, *H. Nagamasu et al. 035443* (MBK); along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2080-2660 m, 30 May 2012, *K. Fujikawa et al. 089605* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053382* (MBK); *053385* (MBK); 2600 m, 10 Dec. 2008, *M. Matsumoto 053571* (MBK); *053576* (MBK).

Distribution. N India, Nepal, Bhutan, China, Thailand, Vietnam.

**Athyrium drepanopterum** (Kunze) A. Braun ex Milde, Fil. Eur. 49. 1867; Ferns Burma: 123. 1946; Fl. China 2–3: 463. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: 7 miles from the entrance of National Park, NMT NP, ca. 2400 m, 5 Dec. 2012, *K. Fujikawa et al. 090102* (MBK).

Distribution. N India, Nepal, Bhutan, China, Vietnam, Philippines.

**Athyrium falcatum** Bedd. in Ferns S. India t. 151. 1863; Ferns Burma: 123.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 9 June 2002, *N. Tanaka et al. 023812* (MBK).

Distribution. India.

**Athyrium mackinnoniorum** (C. Hope) C. Chr., Index Filic.: 143. 1905; Fl. China 2–3: 476. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 1800-2750 m, 11 Mar. 2002, *J. Murata et al. 022936* (MBK); along the walking trail between 16 miles base camp of Natma Taung and summit of Natma Taung (Mt. Victoria), NMT NP, 2800-3000 m, 13 Aug. 2008, *K. Fujikawa et al. 053493* (MBK). Mindat Township: along the trail between 12 miles from Mindat (Mindat-Matupi road) and Lone Pang village, NMT NP, 2554 m, 18 Feb. 2012, *K. Fujikawa et al. 086849* (MBK).

Distribution. Afghanistan, Pakistan, N India, Nepal, China, Thailand, Vietnam.

**Athyrium roseum** Christ in Bull. Herb. Boissier 6: 961. 1898; Fl. China 2–3: 486. 2013.

Distribution. China.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Deparia boryana** (Willd.) M. Kato in Bot. Mag. (Tokyo) 90: 36. 1977; Fl. China 2–3: 425. 2013.

— *Athyrium boryanum* Tagawa in Acta Phytotax. Geobot. 4: 144. 1935; Ferns Burma: 122. 1946.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053547* (MBK); NMT NP, 2640 m, 7 June 2002, *N. Tanaka et al. 023775* (MBK).

Distribution. Sri Lanka, India, Nepal, China, Thailand, Vietnam, Malaysia, Indonesia, Philippines; Africa.

**Deparia wilsonii** (Christ) X.C.Zhang, Lycophytes Ferns China 391. 2012; Fl. China 2–3: 432. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: road between Kanpetlet and Mindat, ca. 6 miles from Kanpetlet, NMT NP, 2300 m, 25 May 2007, *N. Kuroiwa et al. 051262* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053395* (MBK). Mindat Township: 37 miles from Mindat, between Mindat and Matupi (Mindat-Matupi Road), NMT NP, 2450-2545 m, 31 Aug. 2013, *K. Fujikawa et al. 094735* (MBK).

Distribution. China.

Note. This is a new record for Myanmar.

**Diplazium bellum** (C.B.Clarke) Bir in Mehra & Bir, Res. Bull. Panjab Univ. Sci., n.s. 15: 148. 1964; Fl. East. Himal.: 474. 1966; Fl. China 2–3: 509. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: above Kanpetlet near old town village, NMT NP, ca. 1755 m, 1 Dec. 2012, *K. Fujikawa et al. 090014* (MBK); 4-8 miles from entrance of National Park, between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, ca. 2200-2600 m, 29 May 2012, *K. Fujikawa et al. 089525* (MBK); NMT NP, 2305 m, 6 June 2002, *N. Tanaka et al. 023764* (MBK); ca. 2450-2500 m, 12 Mar. 2002, *J. Murata et al. 022051* (MBK); road between Kanpetlet and Mindat, ca. 18 miles from Kanpetlet, NMT NP, 2373 m, 21 Feb. 2007, *K. Fujikawa et al. 050064* (MBK).

Distribution. India, Nepal, Bhutan, China.

**Diplazium esculentum** (Retz.) Sw. in J. Bot. 1801(2): 312. 1803; Fl. Thailand 3: 466. 1988; Fl. China 2–3: 505. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Mindat Township: Mindat area, NMT NP, 18 Apr. 2012, *Law Shine 088427* (MBK).

Distribution. Tropical Asia, subtropical and tropical Polynesia.

**Diplazium maximum** (D.Don) C.Chr., Index Filic.: 235. 1905.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053545* (MBK); roadside between Kanpetlet and Yelong Pan village, NMT NP, 1510 m, 24 Feb. 2014, *P. Srisanga et al. 097251* (MBK); NMT NP, ca. 2450-2500 m, 12 Mar. 2002, *J. Murata et al. 022065* (MBK).

Distribution. India, Nepal, China, S Japan, Thailand, Laos, Vietnam, Malaysia, Indonesia, Philippines; tropical Australia, Pacific islands (Polynesia).

**Diplazium muricatum** (Mett.) Alderw., *Malayan Ferns*: 829. 1909; *Fl. East. Himal.*: 474. 1966; *Fl. Thailand* 3: 461. 1988; *Fl. China* 2–3: 511. 2013; Lindsay & Middleton, *Ferns of Thailand, Laos and Cambodia*. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Mindat Township: around Mindat, NMT NP, 2000-2300 m, 2 Mar. 2004, *N. Kuroiwa et al. 030430* (MBK); track through forest from 16 miles basecamp to Hilong village joining up with main road from Mindat at around 14 miles walking back up to 16 miles basecamp, NMT NP, 2370 m, 4 Mar. 2014, *M. Norsaeangri et al. 097564* (MBK).

Distribution. India, Nepal, China, Thailand.

**Diplazium spectabile** (Wall. ex Mett.) Ching in *Lingnan Sc. Journ.* 15: 278. 1936; *Fl. China* 2–3: 512. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 1800-2750 m, 14 Mar. 2002, *J. Murata et al. 022955* (MBK). Matupi Township: track off road, approximately 2 miles along track from Matupi to Palatwa, on right to Chan Pyang village, NMT NP, 1676 m, 11 Mar. 2014, *P. Srisanga et al. 097818* (MBK).

Distribution. India, Nepal, Bhutan, China.

**Diplazium succulentum** (C.B.Clarke) C.Chr. in *Index Filic.* 240. 1905; *Fl. China* 2–3: 533. 2013.

Distribution. India, China.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

### Hypodematiaceae Ching

**Hypodematium crenatum** (Forssk.) Kuhn & Decken in *Kersten, Reisen. Ost-Afr.* 3(3): 37. 1879; *Ferns Burma*: 122. 1946; *Fl. Thailand* 3: 437. 1988; *Fl. China* 2–3: 536. 2013; Hwang et al. in *Korean J. Pl. Taxon.* 45: 112. 2015; Lindsay & Middleton, *Ferns of Thailand, Laos and Cambodia*. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: Makyauk Ar village area, ca. 1371 m, 24 Dec. 2011, *Ling Shein Man 088050* (MBK); along the roadside between Kanpetlet and Kyat

Chan village, NMT NP, 2000 m, 3 Jan. 2013, *Ling Shein Man 096108* (MBK). Mindat Township: around Chi Chaung river (Chi river), NMT NP, 4 Mar. 2013, *M. Matsumoto 091238* (MBK).

Distribution. N India, China, Japan, Thailand, Laos, Malaysia, Philippines; Africa, SW and subtropical regions of Asia.

**Leucostegia immersa** C.Presl, Tent. Pterid.: 95. 1836; Ferns Burma: 131. 1946; Fl. East. Himal.: 469. 1966; Fl. Thailand 3: 169. 1985; Fl. China 2–3: 539. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053555* (MBK); NMT NP, ca. 1500 m, 4 Sep. 2012, *Ling Shein Man 091666* (MBK); along the walking trail between Kanpetlet and Yelong Pan village, NMT NP, 1552 m, 2 Aug. 2008, *K. Fujikawa et al. 053098* (MBK); along the walking trail between 16 miles base camp of Natma Taung and summit of Natma Taung (Mt. Victoria), NMT NP, 2260 m, 13 Aug. 2008, *K. Fujikawa et al. 053485* (MBK).

Distribution. India, Bhutan, China, Thailand, Cambodia, Malaysia, Indonesia, Philippines, New Guinea; Pacific islands (Polynesia).

Note. This species was reported by Phyto Kay Khine et al. (2017) as “*Leucostegia truncata* (D.Don) Fraser-Jenk.”.

### Dryopteridaceae Herter

**Arachniodes henryi** (Christ) Ching in Acta Bot. Sin. 10: 258. 1962; Fl. Thailand 3: 342, f. 30.7-8. 1988; Fl. China 2–3: 558. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053553* (MBK).

Distribution. China, Thailand, N Vietnam.

**Arachniodes simulans** (Ching) Ching in Acta Bot. Sin. 10: 259. 1962; Fl. China 2–3: 558. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 2305 m, 6 June 2002, *N. Tanaka et al. 023763* (MBK); road between Kanpetlet and Mindat, ca. 18 miles from Kanpetlet, NMT NP, 2373 m, 21 Feb. 2007, *K. Fujikawa et al. 050065* (MBK).

Distribution. India, Bhutan, China, Japan.

**Bolbitis sinensis** (Baker) K.Iwats. in Acta Phytotax. Geobot. 18: 49. 1959; Fl. East. Himal.: 472. 1966; Fl. Thailand 3: 318. 1988; Fl. China 2–3: 715. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved

Aug. 1, 2016.

— *Egenofolia sinensis* (Baker) Maxon in Proc. Biol. Soc. Washington 36: 173. 1923; Ferns Burma: 121. 1946.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053549* (MBK); between Kanpetlet and Makyauk Ar village, NMT NP, 1475 m, 27 Feb. 2013, *S. Sangvirotjanaphat et al. 091075* (MBK); above Kanpetlet near old town village, NMT NP, ca. 1755 m, 1 Dec. 2012, *K. Fujikawa et al. 090013* (MBK). Mindat Township: near Mindat, 1200 m, 8 Sep. 2011, *H. Funakoshi et al. 085207* (MBK). Matupi Township: Pong Thsala waterfall on Laemio river, approximately 3 miles from Tisawn village, NMT NP, 1283 m, 8 Mar. 2014, *P. Srisanga et al. 097666* (MBK).

Distribution. India, Bangladesh, China, Thailand, Cambodia, Vietnam, Indonesia, Lesser Sunda Islands.

***Ctenitis decurrentipinnata*** (Ching) Ching in Bull. Fan Mem. Inst. Biol., Bot. 8: 291–292. 1938; Fl. China 2–3: 559. 2013; Thet et al. in Korean J. Pl. Taxon. 46: 286. 2016.

Distribution. China, Vietnam, Philippines.

Note. The species was reported by Thet Yu Nwe et al. (2016) from Natma Taung NP.

***Ctenitis subglandulosa*** (Hance) Ching in Bull. Fan Mem. Inst. Biol., Bot. 8: 302. 1938; Fl. China 2–3: 561. 2013.

— *Ctenitis rhodolepis* (C.B.Clarke) Ching in Bull. Fan Mem. Inst. Biol. Bot. 8: 300. 1938; Ferns Burma: 120. 1946.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 2540 m, 8 June 2002, *N. Tanaka et al. 023798* (MBK); ca. 2900–3050 m, 9 Mar. 2002, *J. Murata et al. 022885* (MBK).

Distribution. India, Bhutan, China, Vietnam, Malaysia, Philippines; SE Asia.

***Dryopteris atrata*** (Wall. ex Kunze) Ching in Sinensia 3: 326. 1933; Ferns Burma: 119. 1946; Fl. East. Himal.: 475. 1966; Fl. China 2–3: 578. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2030 m, 11 Feb. 2012, *K. Fujikawa et al. 086528* (MBK); 2330 m, 12 Feb. 2012, *K. Fujikawa et al. 086032* (MBK); 5 miles from Kanpetlet to NMT NP, ca. 2133 m, 9 Jan. 2012, *Ling Shein Man 088161* (MBK); 4–8 miles from tentrance of National Park, between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, ca. 2200–2600 m, 29 May 2012, *K. Fujikawa et al. 089553* (MBK); NMT NP, 2360 m, 3 June 2002, *N. Tanaka et al. 023707* (MBK); ca. 2450–2500 m, 12 Mar. 2002, *J. Murata et al. 022050* (MBK); *022061* (MBK); ca. 2500 m, 12 Mar. 2002, *J. Murata et al. 022042* (MBK). Mindat Township: between Ohn village and Lone Pan village, NMT NP, 2155 m, 6 Mar. 2014, *P. Srisanga et al. 097634* (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, China, Thailand, Vietnam.

Reproductive mode. apogamous (32 spores/sporangium).

**Dryopteris caroli-hopei** Fraser-Jenkins in Bull. Brit. Mus. (Nat. Hist.), Bot. 18(5): 422. 1989. Fl. China 2–3: 596. 2013.

Distribution. India, Nepal, Bhutan, China.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Dryopteris chrysocoma** (Christ) C.Chr., Index Filic.: 257. 1905; Ferns Burma: 119. 1946; Fl. East. Himal.: 476. 1966; Fl. China 2–3: 583. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053394* (MBK); along the walking trail between 16 miles base camp of Natma Taung and summit of Natma Taung (Mt. Victoria), NMT NP, 2900 m, 13 Aug. 2008, *K. Fujikawa et al. 053488* (MBK); *053490* (MBK); NMT NP, 2980 m, 3 June 2002, *N. Tanaka et al. 023743* (MBK).

Distribution. Pakistan, India, Nepal, Bhutan, China.

**Dryopteris cochleata** (Buch.-Ham. ex D.Don) C.Chr., Index Filic.: 258. 1905; Ferns Burma: 119. 1946; Fl. East. Himal.: 476. 1966; Fl. Thailand 3: 347. 1988; Fl. China 2–3: 594. 2013; Hwang et al. in Korean J. Pl. Taxon. 45: 112. 2015; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053823* (MBK); along the roadside between Kanpetlet and Saw Long, NMT NP, 1245 m, 26 Feb. 2013, *S. Sangvirotjanaphat et al. 091037* (MBK); between Kanpetlet and Kantar Yon village, 1310 m, 12 Sep. 2011, *H. Funakoshi et al. 085279* (MBK); along foot path between Makyauk Ar village and Kyat Chan village, NMT NP, 1345-1520 m, 10 Sep. 2013, *K. Fujikawa et al. 095373* (MBK); along the trail between Kanpetlet and Yelong Pan village, 1450-1262 m, 13 Feb. 2012, *K. Fujikawa et al. 086608* (MBK). Mindat Township: Mindat, NMT NP, 26 Feb. 2009, *M. Matsumoto 053587* (MBK). MAGWAY REGION. Saw Township: ca. 459 m, 8 Mar. 2006, *H. Nagamasu et al. 035505* (MBK).

Distribution. Pakistan, India, Nepal, Bhutan, Bangladesh, China, Thailand, Laos, Indonesia, Philippines.

Reproductive mode. sexual (64 spores/sporangium).

**Dryopteris fructuosa** (Christ) C.Chr., Index Filic.: 267. 1905; Fl. China 2–3: 593. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 8 June 2002, *N. Tanaka et*



*al.* 023803 (MBK); ca. 1800-2750 m, 14 Mar. 2002, *J. Murata et al.* 022952 (MBK); ca. 1803 m, 6 Mar. 2006, *H. Nagamasu et al.* 035439 (MBK); 2675 m, 3 June 2002, *N. Tanaka et al.* 023749 (MBK); road between Kanpetlet and Mindat, 6-8 miles from Kanpetlet, NMT NP, 2400 m, 26 May 2007, *N. Kuroiwa et al.* 051307 (MBK); 7 miles from the entrance of National Park, NMT NP, ca. 2400 m, 5 Dec. 2012, *K. Fujikawa et al.* 090101 (MBK). Mindat Township: a road between Mindat and Saw, 2 Mar. 2004, *N. Kuroiwa et al.* 030452 (MBK).

Distribution. India, Nepal, Bhutan, China.

Reproductive mode. apogamous (32 spores/sporangium).

**Dryopteris hendersonii** (Bedd.) C.Chr., Index Filic.: 270. 1905; Ferns Burma: 120. 1946; Fl. Thailand 3: 350. 1988; Fl. China 2-3: 619. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaifers/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: 4-8 miles from entrance of National Park, between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, ca. 2200-2600 m, 29 May 2012, *K. Fujikawa et al.* 089526 (MBK); NMT NP, 2210 m, 6 June 2002, *N. Tanaka et al.* 023762 (MBK); ca. 2450-2500 m, 12 Mar. 2002, *J. Murata et al.* 022047 (MBK); road between Kanpetlet and Mindat, ca. 18 miles from Kanpetlet, NMT NP, 2373 m, 21 Feb. 2007, *K. Fujikawa et al.* 050063 (MBK).

Distribution. N India, Nepal, China, S Japan, Thailand, Malaysia, Philippines.

**Dryopteris lepidopoda** Hayata, Icon. Pl. Formosan. 4: 161, 1914; Fl. China 2-3: 586. 2013.

Distribution. India, Nepal, Bhutan, China.

Note. The species was reported by Thet Yu Nwe et al. (2019) from Natma Taung NP.

**Dryopteris marginata** (C.B.Clarke) Christ in Philipp. J. Sci., C 2: 212. 1907; Ferns Burma: 120. 1946; Fl. East. Himal.: 476. 1966; Fl. China 2-3: 596. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 1650-1800 m, 8 Mar. 2002, *J. Murata et al.* 022870 (MBK); ca. 1803 m, 6 Mar. 2006, *H. Nagamasu et al.* 035438 (MBK); ca. 1829 m, 11 Mar. 2002, *J. Murata et al.* 022927 (MBK); northern side of Old town area, ca. 1828 m, 26 Nov. 2011, *Ling Shein Man* 087911A (MBK); 087912 (MBK); 087915 (MBK); water resort area, near Kanpetlet, ca. 1837 m, 4 Jan. 2012, *Ling Shein Man* 088094 (MBK); road between Kanpetlet and Mindat, ca. 6 miles from Kanpetlet, NMT NP, 2300 m, 24 May 2007, *N. Kuroiwa et al.* 051218 (MBK); along the road between Kanpetlet and 16 miles base camp, NMT NP, 2600 m, 10 Dec. 2008, *M. Matsumoto* 053570 (MBK).

Distribution. India, Nepal, Bhutan, China, Thailand, Vietnam.

Reproductive mode. sexual (64 spores/sporangium).

**Dryopteris paleolata** (Pic.Serm.) Li Bing Zhang in Taxon 61: 1208. 2012; Fl. China 2–3: 621. 2013.

— *Acrophorus stipellatus* (Wall.) T.Moore in Gard. Chron. 1854: 135. 1854; Ferns Burma: 131. 1946; Fl. East. Himal.: 470. 1966; Fl. Thailand 3: 328. 1988.

Specimens examined. CHIN STATE. Kanpetlet Township: along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053392* (MBK); road between Kanpetlet and Mindat, 6–8 miles from Kanpetlet, NMT NP, 2400 m, 26 May 2007, *N. Kuroiwa et al. 051304* (MBK); road through park, walking along the road 1 mile to 7 miles from Park Office, NMT NP, 2474 m, 20 Feb. 2014, *P. Srisanga et al. 097021* (MBK); along the road between Kanpetlet and 16 miles base camp, NMT NP, 2600 m, 10 Dec. 2008, *M. Matsumoto 053583* (MBK); along the trail to the top of Mt. Victoria, NMT NP, ca. 2750–3050 m, 3 Dec. 2002, *J. Murata et al. 024893* (MBK).

Distribution. India, Nepal, Bhutan, China, Japan, Vietnam, Philippines.

Reproductive mode. sexual (64 spores/sporangium).

**Dryopteris peranema** Li Bing Zhang in Taxon. 61: 1211. 2012; Fl. China 2–3: 627. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: 14 Jan. 2012, *Ling Shein Man 088184* (MBK); 2620 m, 7 June 2002, *N. Tanaka et al. 023774* (MBK); ca. 2989 m, 5 Mar. 2006, *H. Nagamasu et al. 035371* (MBK); along the trail to the top of Mt. Victoria, NMT NP, ca. 2750–3050 m, 3 Dec. 2002, *J. Murata et al. 024891* (MBK). Mindat Township: roadside approximately 40 miles from Mindat (approximately 24 miles from 16 miles basecamp), NMT NP, 2480 m, 1 Mar. 2014, *P. Srisanga et al. 097447* (MBK); 37 miles from Mindat, along the road between Mindat and Matupi (Mindat-Matupi road), NMT NP, 2530 m, 17 Feb. 2012, *K. Fujikawa et al. 086115* (MBK); along the trail between 12 miles from Mindat (Mindat-Matupi road) and Lone Pang village, NMT NP, 2554 m, 18 Feb. 2012, *K. Fujikawa et al. 086847* (MBK); *086852* (MBK).

Distribution. Himalaya, China.

Reproductive mode. sexual (64 spores/sporangium).

**Dryopteris pseudocaenopteris** (Kunze) Li Bing Zhang in Taxon 61: 1209. 2012; Fl. China 2–3: 624. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 1800–2750 m, 14 Mar. 2002, *J. Murata et al. 022946* (MBK); 2415 m, 3 June 2002, *N. Tanaka et al. 023717* (MBK); ca. 2500 m, 12 Mar. 2002, *J. Murata et al. 022045* (MBK); along the roadside between 3 and 7 miles from Kanpetlet to NMT NP, ca. 2133 m, 9 Jan. 2012, *Ling Shein Man 088133* (MBK); along the road between Kanpetlet and 16 miles base camp, NMT NP, 2600 m, 10 Dec. 2008, *M. Matsumoto 053580* (MBK); ca. 13 miles from entrance of National Park, between Kanpetlet and Mindat seasonal road, NMT NP, 2610 m, 28 May 2012, *K. Fujikawa et al. 089395* (MBK). Mindat Township: along new road towards Maha Myaing village, NMT NP, 2526 m, 27 Feb. 2014, *P. Srisanga et al. 097333* (MBK); Matupi Township: track off road, approximately 2 miles along

track from Matupi to Palatwa, on right to Chan Pyang village, NMT NP, 1676 m, 11 Mar. 2014, *P. Srisanga et al.* 097823 (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, China, Thailand, Vietnam, Malaysia, Indonesia, Philippines, New Guinea.

**Dryopteris pteridoformis** Christ in Bull. Acad. Int. Géogr. Bot. 17: 137. 1907; Fl. China 2–3: 595. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 2450–2500 m, 12 Mar. 2002, *J. Murata et al.* 022066 (MBK).

Distribution. India, China.

**Dryopteris scottii** (Bedd.) Ching in Bull. Dept. Biol. Sun Yatsen Univ. 6: 3. 1933; Fl. China 2–3: 576. 2013.

Distribution. India, Nepal, Bhutan, China, Japan, Thailand, Vietnam.

Note. The species was reported by Phyo Kay Khine et al. (2017) from Natma Taung NP.

**Dryopteris sparsa** (D. Don) Kuntze, Revis. Gen. Pl. 2: 813. 1891; Ferns Burma: 132. 1946; Fl. East. Himal.: 476. 1966; Fl. Thailand 3: 352. 1988; Fl. China 2–3: 602. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: along the roadside between Kanpetlet and Saw Loung village, NMT NP, 1245 m, 26 Feb. 2013, *S. Sangvirotjanaphat et al.* 091037A (MBK); NMT NP, ca. 2450–2500 m, 12 Mar. 2002, *J. Murata et al.* 022053 (MBK).

Distribution. India, Nepal, Bhutan, China, Japan, Thailand, Vietnam, Indonesia.

Reproductive mode. sexual (64 spores/sporangium).

**Dryopteris wallichiana** (Spreng.) Hyl. in Bot. Not. 1953: 352. 1953; Fl. China 2–3: 588. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 8 June 2002, *N. Tanaka et al.* 023804 (MBK); 2415 m, 3 June 2002, *N. Tanaka et al.* 023714 (MBK); 2530 m, 8 June 2002, *N. Tanaka et al.* 023802 (MBK); 2890 m, 3 June 2002, *N. Tanaka et al.* 023746 (MBK); ca. 2900–3050 m, 9 Mar. 2002, *J. Murata et al.* 022876 (MBK); 022887 (MBK); 022888 (MBK); 2920 m, 3 June 2002, *N. Tanaka et al.* 023745 (MBK); ca. 2956 m, 5 Mar. 2006, *H. Nagamasu et al.* 035369 (MBK); along the roadside between 3 and 7 miles from Kanpetlet to NMT NP, ca. 2286 m, 9 Jan. 2012, *Ling Shein Man* 088143 (MBK); road through park, walking along the road 1 mile to 7 miles from Park Office, NMT NP, 2474 m, 20 Feb. 2014, *P. Srisanga et al.* 097029 (MBK); along the trail to the top of Mt. Victoria, NMT NP, ca. 2750–3050 m, 3 Dec. 2002, *J. Murata et al.* 024892 (MBK); along the walking trail between 16 miles base camp of Natma Taung and summit of Natma Taung (Mt. Victoria), NMT NP, 2800–3000 m, 13 Aug. 2008, *K. Fujikawa et al.* 053498

(MBK); 2900 m, 13 Aug. 2008, *K. Fujikawa et al. 053489* (MBK); *053491* (MBK); summit of Natma Taung (Mt. Victoria), NMT NP, 3035 m, 18 Jan. 2011, *K. Fujikawa et al. 084061* (MBK).

Distribution. India, Nepal, Bhutan, China, Japan, Malaysia.

Reproductive mode. apogamous (32 spores/sporangium).

**Elaphoglossum angulatum** (Blume) T.Moore, Index Filic.: 5. 1857; Fl. Thailand 3: 305. 1988; Lindsay et al. in Thai Forest Bull., Bot. 37: 76. 2009; Fl. China 2–3: 721. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaifers/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053558A* (MBK); trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088478* (MBK); *088487* (MBK); along the walking trail between Kanpetlet and Yelong Pan village, NMT NP, 1552 m, 2 Aug. 2008, *K. Fujikawa et al. 053097* (MBK); road between Kanpetlet and Mindat, ca. 6 miles from Kanpetlet, NMT NP, 2100 m, 24 May 2007, *N. Kuroiwa et al. 051219* (MBK); along the roadside between the Chin Village Resort and the entrance to the trail to the top of Mt. Victoria, NMT NP, ca. 2430-2540 m, 5 Dec. 2002, *J. Murata et al. 025012* (MBK); along unpaved road between 6 miles and 7 miles from entrance of National Park, NMT NP, 2490 m, 15 Sep. 2013, *K. Fujikawa et al. 095540* (MBK). Mindat Township: along foot path between 14 miles junction from Mindat and Hilong village, NMT NP, 1670-2445 m, 2 Sep. 2013, *K. Fujikawa et al. 094938* (MBK); along the walking trail between Hilong village and the junction of 14 miles from Mindat, NMT NP, 1740 m, 5 Aug. 2008, *K. Fujikawa et al. 053136* (MBK). Matupi Township: road from Matupi to Palatwa, NMT NP, 1821 m, 10 Mar. 2014, *P. Srisanga et al. 097803* (MBK).

Distribution. Sri Lanka, S India, China, Thailand, Vietnam, Malaysia, Indonesia, Philippines; E Africa, Madagascar.

Note. This is a new record for Myanmar.

**Elaphoglossum marginatum** (Wall. ex Fée) T.Moore, Index Fil. 11. 1857; Fl. China 2–3: 722. 2013.

Distribution. Nepal, Bhutan, NE India, China, Vietnam, Malaysia, Indonesia, Philippines.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Polystichum acutidens** Christ in Bull. Acad. Int. Géogr. Bot. 11: 259. 1902; Fl. China 2–3: 712. 2013.

Specimens examined. CHIN STATE. Matupi Township: roadside between Matupi and Mindat, approximately 12 miles from Matupi walking downhill towards the Laemio river, NMT NP, 920 m, 12 Mar. 2014, *P. Srisanga et al. 097886* (MBK).

Distribution. N India, China, Thailand, N Vietnam.

**Polystichum attenuatum** Tagawa & K.Iwats. in Acta Phytotax. Geobot. 23: 113. 1968; Fl. Thailand 3: 335. 1988; Fl. China 2–3: 655. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 2395 m, 3 June 2002, *N. Tanaka et al. 023710* (MBK); 2530 m, 8 June 2002, *N. Tanaka et al. 023801* (MBK); ca. 2585 m, 4 Mar. 2006, *H. Nagamasu et al. 035339* (MBK); 2670 m, 3 June 2002, *N. Tanaka et al. 023757* (MBK); 2675 m, 3 June 2002, *N. Tanaka et al. 023751* (MBK); ca. 2860 m, 9 Mar. 2002, *J. Murata et al. 022895* (MBK); ca. 2900–3050 m, 9 Mar. 2002, *J. Murata et al. 022896* (MBK); along the road between Kanpetlet and 16 miles base camp, NMT NP, 2600 m, 10 Dec. 2008, *M. Matsumoto 053574* (MBK); ca. 13 miles from entrance of National Park, between Kanpetlet and Mindat seasonal road, NMT NP, 2610 m, 28 May 2012, *K. Fujikawa et al. 089418* (MBK); along unpaved road between 8 miles and 10 miles base camp from entrance of National Park, NMT NP, 2680 m, 22 Aug. 2013, *K. Fujikawa et al. 094235* (MBK); along the trail to the top of Mt. Victoria, NMT NP, ca. 2750–3050 m, 3 Dec. 2002, *J. Murata et al. 024894* (MBK). Mindat Township: along the trail between 12 miles from Mindat (Mindat-Matupi road) and Lone Pang village, NMT NP, 2500 m, 18 Feb. 2012, *K. Fujikawa et al. 086133* (MBK); 2554 m, 18 Feb. 2012, *K. Fujikawa et al. 086846* (MBK).

Distribution. NE India, China, Thailand, Vietnam.

Reproductive mode. sexual (64 spores/sporangium).

**Polystichum discretum** (D.Don) J.Sm. in J. Bot. (Hooker) 3: 413. 1841; Fl. China 2–3: 658. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 1800–2750 m, 11 Mar. 2002, *J. Murata et al. 022937* (MBK); 2640 m, 7 June 2002, *N. Tanaka et al. 023776* (MBK); ca. 2656 m, 4 Mar. 2006, *H. Nagamasu et al. 035336* (MBK); 4–8 miles from entrance of National Park, between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, ca. 2200–2600 m, 29 May 2012, *K. Fujikawa et al. 089548* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053402* (MBK); road between Kanpetlet and Mindat, 10–12 miles from Kanpetlet, NMT NP, 2677 m, 29 May 2007, *K. Fujikawa et al. 051384* (MBK); 10–11 miles from the entrance of National Park, along the roadside between Kanpetlet and Mindat, NMT NP, ca. 2700 m, 20 Feb. 2012, *K. Fujikawa et al. 086169* (MBK); *086171* (MBK); northern side area of Natma Taung (Mt. Victoria), NMT NP, ca. 2743 m, 19 Nov. 2011, *Ling Shein Man 087862A* (MBK). Mindat Township: around Mindat, NMT NP, 2000–2300 m, 2 Mar. 2004, *N. Kuroiwa et al. 030436* (MBK); roadside approximately 40 miles from Mindat (approximately 24 miles from 16 miles basecamp), NMT NP, 2480 m, 1 Mar. 2014, *P. Srisanga et al. 097448* (MBK); along the trail between 12 miles from Mindat (Mindat-Matupi road) and Lone Pang village, NMT NP, 2554 m, 18 Feb. 2012, *K. Fujikawa et al. 086850* (MBK).

Distribution. Pakistan, India, Nepal, Bhutan, China, Thailand.

Reproductive mode. sexual (64 spores/sporangium).

**Polystichum hookerianum** (C.Presl) C.Chr., Index Filic.: 67. 1905; Fl. China 2–3: 690. 2013.

— *Cyrtomium hookerianum* (C.Presl) C.Chr., Index Suppl.: 101. 1930; Ferns Burma.: 120. 1946; Fl. East. Himal.: 473. 1966.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 2230 m, 6 June 2002, *N. Tanaka et al. 023760* (MBK). Mindat Township: around Mindat, NMT NP, 2000–2300 m, 2 Mar. 2004, *N. Kuroiwa et al. 030433* (MBK); along the roadside Hilon village, Mindat, the NMT NP, ca. 2300–2500 m, 28 Apr. 2003, *J. Murata et al. 029261* (MBK); track through forest from 16 miles basecamp to Hilong village joining up with main road from Mindat at around 14 miles walking back up to 16 miles basecamp, NMT NP, 2370 m, 4 Mar. 2014, *M. Norsaengsri et al. 097565* (MBK).

Distribution. N India, Nepal, Bhutan, China, N Vietnam.

**Polystichum piceopaleaceum** Tagawa in Acta Phytotax. Geobot. 5: 255. 1936; Fl. China 2–3: 672. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 1803 m, 6 Mar. 2006, *H. Nagamasu et al. 035441* (MBK); 2415 m, 3 June 2002, *N. Tanaka et al. 023715* (MBK); 2420 m, 3 June 2002, *N. Tanaka et al. 023720* (MBK); ca. 2500 m, 12 Mar. 2002, *J. Murata et al. 022041* (MBK); 2530 m, 8 June 2002, *N. Tanaka et al. 023800* (MBK); ca. 2602 m, 4 Mar. 2006, *H. Nagamasu et al. 035342* (MBK); 2675 m, 3 June 2002, *N. Tanaka et al. 023752* (MBK); ca. 2900–3050 m, 9 Mar. 2002, *J. Murata et al. 022889* (MBK); ca. 13 miles from entrance of National Park, between Kanpetlet and Mindat seasonal road, NMT NP, 2610 m, 28 May 2012, *K. Fujikawa et al. 089421* (MBK); road between Kanpetlet and Mindat, 10–12 miles from Kanpetlet, NMT NP, 2772 m, 29 May 2007, *K. Fujikawa et al. 051411* (MBK).

Distribution. NE Afghanistan, Pakistan, Sri Lanka, India, Nepal, Bhutan, China, Japan.

Reproductive mode. sexual (64 spores/sporangium).

**Polystichum semifertile** (C.B.Clarke) Ching in Lingnan Sci. J. 15: 398. 1936; Fl. Thailand 3: 338. 1988; Fl. China 2–3: 658. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: Old Kanpetlet, NMT NP, 1 Mar. 2009, *M. Matsumoto 053588* (MBK); along the roadside near the Chin Village Resort, NMT NP, ca. 1750–2700 m, 3 Dec. 2002, *J. Murata et al. 025152* (MBK); NMT NP, ca. 1800–2750 m, 11 Mar. 2002, *J. Murata et al. 022931* (MBK); 2420 m, 3 June 2002, *N. Tanaka et al. 023721* (MBK); ca. 2450–2500 m, 12 Mar. 2002, *J. Murata et al. 022046* (MBK); ca. 2457 m, 6 Mar. 2006, *H. Nagamasu et al. 035433* (MBK); ca. 2500 m, 12 Mar. 2002, *J. Murata et al. 022035* (MBK); 022043 (MBK); ca. 2602 m, 4 Mar. 2006, *H. Nagamasu et al. 035341* (MBK); northern side of Old town area, ca. 1828 m, 26 Nov. 2011, *Ling Shein Man 087911* (MBK); 4–8 miles from tentrance of National Park, between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, ca. 2200–2600 m, 29 May 2012, *K. Fujikawa et al. 089552* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11

Aug. 2008, *K. Fujikawa et al. 053403* (MBK); along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2330 m, 12 Feb. 2012, *K. Fujikawa et al. 086034* (MBK); road between Kanpetlet and Mindat, ca. 18 miles from Kanpetlet, NMT NP, 2373 m, 21 Feb. 2007, *K. Fujikawa et al. 050070* (MBK); road through park, walking along the road 1 mile to 7 miles from Park Office, NMT NP, 2474 m, 20 Feb. 2014, *P. Srisanga et al. 097026* (MBK); along the road between Kanpetlet and 16 miles base camp, NMT NP, 2600 m, 10 Dec. 2008, *M. Matsumoto 053572* (MBK); *053577* (MBK); *053578* (MBK); northern side area of Natma Taung (Mt. Victoria), NMT NP, ca. 2743 m, 19 Nov. 2011, *Ling Shein Man 087858* (MBK); *087862* (MBK). Mindat Township: around Mindat, NMT NP, 2000-2300 m, 2 Mar. 2004, *N. Kuroiwa et al. 030434* (MBK); *030435* (MBK); between Ohn village and Lone Pan village, NMT NP, 2155 m, 6 Mar. 2014, *P. Srisanga et al. 097629* (MBK); along the roadside between Mindat and Matupi township (56 miles N of Mindat), NMT NP, ca. 2400-2500 m, 17 May 2004, *N. Tanaka et al. 030867* (MBK); along the roadside between Mindat and Matupi township, NMT NP, ca. 2400-2600 m, 18 May 2004, *N. Tanaka et al. 030738* (MBK); along new road towards Maha Myaing village, NMT NP, 2526 m, 27 Feb. 2014, *P. Srisanga et al. 097328* (MBK); along the trail between 12 miles from Mindat (Mindat-Matupi road) and Lone Pang village, NMT NP, 2554 m, 18 Feb. 2012, *K. Fujikawa et al. 086851* (MBK). Matupi Township: track off road, approximately 2 miles along track from Matupi to Palatwa, on right to Chan Pyang village, NMT NP, 1676 m, 11 Mar. 2014, *P. Srisanga et al. 097815* (MBK).

Distribution. India, Nepal, China, Thailand, Vietnam.

Reproductive mode. sexual (64 spores/sporangium).

**Polystichum squarrosum** (D. Don) Fée in Mém. Foug. 5: 278. 1852; Fl. China 2-3: 658. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 1800-2750 m, 11 Mar. 2002, *J. Murata et al. 022938* (MBK); ca. 2450-2500 m, 12 Mar. 2002, *J. Murata et al. 022060* (MBK); ca. 2585 m, 4 Mar. 2006, *H. Nagamasu et al. 035338* (MBK); 2675 m, 3 June 2002, *N. Tanaka et al. 023748* (MBK); ca. 2700 m, 14 Jan. 2012, *Ling Shein Man 088183* (MBK); 2740 m, 3 June 2002, *N. Tanaka et al. 023750* (MBK); ca. 2789 m, 5 Mar. 2006, *H. Nagamasu et al. 035363* (MBK); ca. 2900-3050 m, 9 Mar. 2002, *J. Murata et al. 022880* (MBK); *022886* (MBK); ca. 2989 m, 5 Mar. 2006, *H. Nagamasu et al. 035372* (MBK); ca. 13 miles from entrance of National Park, between Kanpetlet and Mindat seasonal road, NMT NP, 2610 m, 28 May 2012, *K. Fujikawa et al. 089411* (MBK); 10-11 miles from the entrance of National Park, along the roadside between Kanpetlet and Mindat, NMT NP, ca. 2700 m, 20 Feb. 2012, *K. Fujikawa et al. 086170* (MBK); *086176* (MBK); along the walking trail between 10 miles base camp and summit of NMT, NMT NP, 2700-3053 m, 15 Feb. 2012, *K. Fujikawa et al. 086729* (MBK); on walking trail of Mt. Victoria, NMT NP, 2900 m, 17 Feb. 2007, *K. Fujikawa et al. 050057* (MBK); summit of Natma Taung (Mt. Victoria), NMT NP, 3035 m, 18 Jan. 2011, *K. Fujikawa et al. 084062* (MBK). Mindat Township: along the trail between 12 miles from Mindat (Mindat-Matupi road) and Lone Pang village, NMT NP, 2554 m, 18 Feb. 2012, *K. Fujikawa et al. 086850A* (MBK).

Distribution. Pakistan, N India, Nepal, Bhutan, China.

Reproductive mode. sexual (64 spores/sporangium).

### Nephrolepidaceae Pic.Serm.

**Nephrolepis cordifolia** (L.) C.Presl, Tent. Pterid.: 79. 1836; Ferns Burma: 132. 1946; Fl. East. Himal.: 473. 1966; Fl. Thailand 3: 172. 1985; Fl. China 2–3: 728. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: between Kanpetlet and Saw, 840 m, 2 Sep. 2011, *H. Funakoshi et al. 085048* (MBK).

Distribution. Pakistan, Sri Lanka, India, Nepal, Bhutan, Bangladesh, China, Korea, Japan, Thailand, Laos, Cambodia, Vietnam, Singapore, Malaysia, Indonesia, Philippines; Africa, SW Asia, Australia, North and South America, Pacific islands.

### Tectariaceae Panigrahi

**Tectaria coadunata** (J.Sm.) C.Chr. in Contr. U.S. Natl. Herb. 26: 331. 1931; Ferns Burma: 121. 1946; Fl. East. Himal.: 481. 1966; Fl. China 2–3: 735. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Tectaria christii* Copel. in Phipp. J. Sci., C 2: 416. 1907; Fl. Thailand 3: 621. 1989.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053548* (MBK); NMT NP, 31 July 2002, *Ling Shein Man & Cho Cho Win 024320* (MBK); ca. 1750-1820 m, 10 Mar. 2002, *J. Murata et al. 022911* (MBK); along the roadside between Saw and Kanpetlet, NMT NP, 475-850 m, 14 Aug. 2008, *K. Fujikawa et al. 053522* (MBK); Yelong Pan stream, Yelong Pan village, ca. 914 m, 17 Dec. 2011, *Ling Shein Man 088004* (MBK); between Kanpetlet and Kantar Yon village, 1200 m, 12 Sep. 2011, *H. Funakoshi et al. 085288* (MBK); along foot path and unpaved new car road between Kanpetlet and Yelong Pan village, NMT NP, 1260-1435 m, 23 Aug. 2013, *K. Fujikawa et al. 094331* (MBK); between Kanpetlet and Yelong Pan village, 1445 m, 15 Sep. 2011, *H. Funakoshi et al. 085371* (MBK); 1510 m, 24 Feb. 2014, *P. Srisanga et al. 097252* (MBK). Mindat Township: near Mindat, along the roadside between Mindat and Kangyi, 1250 m, 19 Feb. 2012, *K. Fujikawa et al. 086860* (MBK).

Distribution. Pakistan, Sri Lanka, India, Nepal, Bhutan, China, Thailand, Laos, Vietnam, Malaysia; tropical Africa, Madagascar.

### Oleandraceae Ching ex Pic.Serm.

**Oleandra musifolia** (Blume) C.Presl, Epimel. Bot. 42. 1851; Fl. China 2–3: 748. 2013.



Distribution. Sri Lanka, China, Thailand, Vietnam, Malaysia, Indonesia.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Oleandra wallichii** (Hook.) C.Presl, Tent. Pterid.: 78. 1836; Ferns Burma: 125. 1946; Fl. East. Himal.: 469. 1966; Fl. Thailand 3: 179. 1985; Fl. China 2–3: 747. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053558* (MBK); along the walking trail between Kanpetlet and Yelong Pan village, NMT NP, 1552 m, 2 Aug. 2008, *K. Fujikawa et al. 053096* (MBK); along unpaved road at 10–14 miles from entrance of National Park between Kanpetlet and Mindat road, NMT NP, 2680 m, 28 Aug. 2013, *K. Fujikawa et al. 094587* (MBK). Mindat Township: along foot path between 14 miles junction from Mindat and Hilong village, NMT NP, 1670–2445 m, 2 Sep. 2013, *K. Fujikawa et al. 094961* (MBK).

Distribution. N India, Nepal, Bhutan, China, Thailand, Vietnam.

### **Davalliaceae M.R.Schomb. ex A.B.Frank**

**Araiostegia faberiana** (C.Chr.) Ching in Chien & Chun, Fl. Reipubl. Popularis Sin. 2: 293. 1959; Fl. Thailand 3: 152. 1985; Fl. China 2–3: 735. 2013.

— *Leucostegia faberiana* (C.Chr.) Ching in C.Chr., Index Filic., Suppl. Tert. 120. 1934; Ferns Burma: 132. 1946.

Specimens examined. CHIN STATE. Kanpetlet Township: along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053386* (MBK).

Distribution. China, Thailand.

**Araiostegia pulchra** (D.Don) Copel. in Philipp. J. Sci. 34: 241. 1927; Fl. East. Himal.: 468. 1966; Fl. Thailand 3: 154. 1985; Fl. China 2–3: 751. 2013.

— *Leucostegia pulchra* (D.Don) J.Sm. in London J. Bot. 1: 426. 1842; Ferns Burma: 132. 1946.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088467* (MBK); along unpaved roadside between 2 and 3 miles from entrance of National Park, NMT NP, 2075 m, 20 Aug. 2013, *K. Fujikawa et al. 094035* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053393* (MBK); NMT NP, 2565 m, 7 June 2002, *N. Tanaka et al. 023785* (MBK); 2780 m, 3 June 2002, *N. Tanaka et al. 023742* (MBK); road between Kanpetlet and Mindat, 10–12 miles from Kanpetlet, NMT NP, 2677 m, 29 May 2007, *K. Fujikawa et al. 051402* (MBK); along the walking trail

between 16 miles base camp of Natma Taung and summit of Natma Taung (Mt. Victoria), NMT NP, 2850 m, 13 Aug. 2008, *K. Fujikawa et al. 053492* (MBK).

Distribution. Sri Lanka, India, Nepal, Bhutan, China, N Thailand, Laos, Vietnam.

### Polypodiaceae J.Presl & C.Presl

**Aglaomorpha coronans** (Wall. ex Mett.) Copel. in Univ. Calif. Publ. Bot. 16: 117. 1929; Fl. East. Himal.: 489. 1966; Fl. Thailand 3: 551. 1989; Fl. China 2–3: 764. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Matupi Township: roadside on road from Matupi to Mindat, approximately 1 mile from Matupi walking down away from the town, NMT NP, 1019 m, 13 Mar. 2014, *P. Srisanga et al. 097948* (MBK).

Distribution. India, Nepal, China, Japan (Ryukyu Islands), Thailand, Laos, Vietnam, Malaysia (Peninsular).

**Arthromeris lehmannii** (Mett.) Ching in Contr. Inst. Bot. Natl. Acad. Peiping. 2: 96. 1933; Ferns Burma: 128. 1946; Fl. East. Himal.: 489. 1966; Fl. Thailand 3: 567. 1989; Fl. China 2–3: 771. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: near Kanpetlet, 30 July 2008, *K. Fujikawa et al. 053018* (MBK); along the roadside between the Chin Village Resort and the entrance to the trail to the top of Mt. Victoria, NMT NP, ca. 1100 m, 6 Dec. 2002, *J. Murata et al. 025181* (MBK); ca. 1750–2550 m, 7 Dec. 2002, *J. Murata et al. 025206* (MBK); northern side of Old town area, ca. 1828 m, 26 Nov. 2011, *Ling Shein Man 087926* (MBK); water resort area, near Kanpetlet, ca. 1828 m, 4 Jan. 2012, *Ling Shein Man 088104* (MBK); NMT NP, 1935 m, 3 June 2002, *N. Tanaka et al. 023739* (MBK); 2600 m, 7 June 2002, *N. Tanaka et al. 023788* (MBK); along unpaved roadside between 2 and 3 miles from entrance of National Park, NMT NP, 2075 m, 20 Aug. 2013, *K. Fujikawa et al. 094036* (MBK).

Distribution. N India, Nepal, Bhutan, China, Thailand, Vietnam, Philippines.

**Arthromeris wallichiana** (Spreng.) Ching in Contr. Inst. Bot. Natl. Acad. Peiping. 2: 92. 1933; Ferns Burma: 128. 1946; Fl. East. Himal.: 490. 1966; Fl. China 2–3: 769. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: along the walking trail between Kanpetlet and Yelong Pan village, NMT NP, 1552 m, 2 Aug. 2008, *K. Fujikawa et al. 053101* (MBK); a long driving road in NMT NP, 1935 m, 3 June 2002, *N. Tanaka et al. 023738* (MBK); NMT NP, 2415 m, 3 June 2002, *N. Tanaka et al. 023716* (MBK).

Distribution. N India, Nepal, Bhutan, China, N Vietnam.

**Drynaria delavayi** Christ, Bull. Soc. Bot. France. 52(Mém. 1): 22. 1905; Fl. China 2–3: 768. 2013.

Distribution. Bhutan, China.

Note. The species was reported by Phyo Kay Khine et al. (2017) as “*Aglaomorpha delavayi* (Christ) Hovenkamp & S.Linds.”.

**Drynaria parishii** (Bedd.) Bedd., Suppl. Ferns S. Ind.: 24. 1876; Fl. Thailand 3: 548. 1989; Lindsay et al. in Thai Forest Bull., Bot. 37: 86. 2009; Fl. China 2–3: 767. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 9 June 2002, *N. Tanaka et al.* 023810 (MBK); 2315 m, 3 June 2002, *N. Tanaka et al.* 023734 (MBK); 2600 m, 7 June 2002, *N. Tanaka et al.* 023790 (MBK).

Distribution. China, Thailand, Vietnam.

**Drynaria propinqua** (Wall. ex Mett.) J.Sm. ex Bedd., Ferns Brit. India 1: t. 160. 1866; Ferns Burma: 128. 1946; Fl. East. Himal.: 489. 1966; Fl. Thailand 3: 547. 1989; Fl. China 2–3: 767. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: along foot path between Kanpetlet and Parkown village, 1155 m, 7 Sep. 2013, *K. Fujikawa et al.* 095092 (MBK); Yelong Pan village, NMT NP, ca. 1500 m, 24 May 2008, *M. Matsumoto & T. Watanabe* 080960 (MBK); around Makyauk Ar village, NMT NP, 1520 m, 3 Dec. 2012, *K. Fujikawa et al.* 090472 (MBK); 4–8 miles from entrance of National Park, between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, ca. 2200–2600 m, 29 May 2012, *K. Fujikawa et al.* 089554 (MBK); NMT NP, 2315 m, 3 June 2002, *N. Tanaka et al.* 023733 (MBK); 2360 m, 3 June 2002, *N. Tanaka et al.* 023708 (MBK); 2655 m, 6 Mar. 2003, *D. Hodel* V16 (MBK). Mindat Township: along the walking trail between Hilong village and 14 miles junction from Mindat (Mindat-Matupi road), NMT NP, 2200 m, 24 May 2012, *K. Fujikawa et al.* 089234 (MBK).

Distribution. N India, Nepal, Bhutan, China, Thailand, Laos, Vietnam.

**Gymnogrammitis dareiformis** (Hook.) Ching ex Tardieu & C.Chr. in Notul. Syst. (Paris). 6: 2. 1937; Fl. Thailand 3: 616. 1989; Fl. China 2–3: 786. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Davallia dareiformis* (Hook.) Levinge ex C.B.Clarke in J. Linn. Soc., Bot. 17: 403. 1879; Fl. East. Himal.: 468. 1966.

— *Leucostegia dareiformis* (Hook.) Bedd., Suppl. Ferns India: 4. 1876; Ferns Burma: 132. 1946.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from

entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088468* (MBK); along unpaved roadside between 2 and 3 miles from entrance of National Park, NMT NP, 2075 m, 20 Aug. 2013, *K. Fujikawa et al. 094033* (MBK); 4-8 miles from entrance of National Park, between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, ca. 2200-2600 m, 29 May 2012, *K. Fujikawa et al. 089534* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053396* (MBK); 6 miles from entrance of NMT NP, along unpaved road between Kanpetlet and 10 miles base camp of National Park, NMT NP, 2400 m, 21 Aug. 2013, *K. Fujikawa et al. 094137* (MBK).

Distribution. India, Nepal, Bhutan, China, Thailand, Laos.

**Lepisorus bicolor** (Takeda) Ching in Bull. Fan Mem. Inst. Biol. 4: 66. 1933; Fl. Thailand 3: 510. 1989; Fl. China 2-3: 819. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaifers/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088464* (MBK); NMT NP, 31 July 2002, *Ling Shein Man & Cho Cho Win 024307* (MBK); ca. 1500 m, 4 Sep. 2012, *Ling Shein Man 091671* (MBK); 1935 m, 3 June 2002, *N. Tanaka et al. 023740* (MBK); 2600 m, 7 June 2002, *N. Tanaka et al. 023789* (MBK); between Kanpetlet and Kantar Yon village, 1310 m, 12 Sep. 2011, *H. Funakoshi et al. 085278* (MBK); Oak Pho village near Kanpetlet, NMT NP, 1525 m, 30 July 2008, *K. Fujikawa et al. 053001* (MBK); along the walking trail between Kanpetlet and Yelong Pan village, NMT NP, 1552 m, 2 Aug. 2008, *K. Fujikawa et al. 053100* (MBK); along unpaved roadside between 2 and 3 miles from entrance of National Park, NMT NP, 2075 m, 20 Aug. 2013, *K. Fujikawa et al. 094029* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053380A* (MBK); road between Kanpetlet and Mindat, 6-8 miles from Kanpetlet, NMT NP, 2400 m, 26 May 2007, *N. Kuroiwa et al. 051306* (MBK); road between Kanpetlet and Mindat, 10-12 miles from Kanpetlet, NMT NP, 2677 m, 29 May 2007, *K. Fujikawa et al. 051397* (MBK). Mindat Township: along the walking trail between Hilong village and the junction of 14 miles from Mindat, NMT NP, 1740 m, 5 Aug. 2008, *K. Fujikawa et al. 053139* (MBK); along unpaved road between 16 miles junction from Mindat and Lone Pang village, NMT NP, 2550 m, 1 Sep. 2013, *K. Fujikawa et al. 094810* (MBK).

Distribution. N India, Nepal, China, Thailand.

**Lepisorus mehrae** Fraser-Jenk. in New Sp. Syndr. Indian Pteridol. 159. 1997.

Distribution. Himalaya.

Note. The species was reported by Phyo Kay Khine et al. (2017) from Natma Taung NP.

**Lepisorus nudus** (Hook.) Ching in Bull. Fan Mem. Inst. Biol. 4: 83. 1933; Fl. Thailand 3: 512. 1989; Fl. China 2-3: 819. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaifers/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 9 June 2002, *N. Tanaka et al. 023811* (MBK); 2370 m, 3 June 2002, *N. Tanaka et al. 023703* (MBK); *023705* (MBK); 2460 m, 3 June 2002, *N. Tanaka et al. 023724* (MBK); around Makyauk Ar village, NMT NP, 1520 m, 3 Dec. 2012, *K. Fujikawa et al. 090471* (MBK); Oak Pho village near Kanpetlet, NMT NP, 1525 m, 31 May 2007, *A. Maeda et al. 051451* (MBK); 3 Dec. 2008, *M. Matsumoto 053542* (MBK); along the roadside near the Kanpetlet guest house, NMT NP, ca. 1700-2030 m, 21 May 2004, *N. Tanaka et al. 030988* (MBK); water resort area, near Kanpetlet, ca. 1828 m, 4 Jan. 2012, *Ling Shein Man 088098* (MBK); along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2080-2660 m, 30 May 2012, *K. Fujikawa et al. 089622* (MBK); road between Kanpetlet and Mindat, ca. 6 miles from Kanpetlet, NMT NP, 2100 m, 24 May 2007, *N. Kuroiwa et al. 051221* (MBK); along the walking trail between 16 miles base camp of Natma Taung and summit of Natma Taung (Mt. Victoria), NMT NP, 2260 m, 13 Aug. 2008, *K. Fujikawa et al. 053487* (MBK); along the road between Kanpetlet and 16 miles base camp, NMT NP, 2600 m, 10 Dec. 2008, *M. Matsumoto 053573* (MBK). Matupi Township: between Panine village and Longdon village, NMT NP, 1289 m, 14 Mar. 2014, *P. Srisanga et al. 097976* (MBK).

Distribution. Pakistan, Sri Lanka, India, Nepal, Bhutan, China, Thailand.

**Lepisorus scolopendrium** (Buch.-Ham. ex D. Don) Mehra & Bir in Res. Bull. Panjab Univ. Sci., n.s. 15: 168. 1964; Fl. East. Himal.: 494. 1966; Fl. Thailand 3: 511. 1989; Fl. China 2-3: 820. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: along the road to the entrance of the trail to the peak of Mt. Victoria, NMT NP, 2030-2295 m, 27 June 2009, *N. Tanaka & T. Yukawa 081319* (MBK); road between Kanpetlet and Mindat, ca. 6 miles from Kanpetlet, NMT NP, 2100 m, 24 May 2007, *N. Kuroiwa et al. 051220* (MBK); along the roadside between 3 and 7 miles from Kanpetlet to NMT NP, ca. 2133 m, 9 Jan. 2012, *Ling Shein Man 088140* (MBK); NMT NP, 2320 m, 3 June 2002, *N. Tanaka et al. 023732* (MBK); 2370 m, 3 June 2002, *N. Tanaka et al. 023704* (MBK); 2585 m, 7 June 2002, *N. Tanaka et al. 023782* (MBK); along the roadside between 4 and 6 miles from Kanpetlet to Natma Taung (Mt. Victoria), NMT NP, 2340 m, 31 July 2008, *K. Fujikawa et al. 053045* (MBK); road between Kanpetlet and Mindat, 6-8 miles from Kanpetlet, NMT NP, 2400 m, 26 May 2007, *N. Kuroiwa et al. 051303* (MBK); along the roadside between the Chin Village Resort and the entrance to the trail to the top of Mt. Victoria, NMT NP, ca. 2430-2540 m, 5 Dec. 2002, *J. Murata et al. 025011* (MBK); road through park, walking along the road 1 mile to 7 miles from Park Office, NMT NP, 2474 m, 20 Feb. 2014, *P. Srisanga et al. 097006* (MBK); ca. 13 miles from entrance of National Park, between Kanpetlet and Mindat seasonal road, NMT NP, 2610 m, 28 May 2012, *K. Fujikawa et al. 089377* (MBK). Mindat Township: between Ohn village and Lone Pan village, NMT NP, 2083 m, 6 Mar. 2014, *P. Srisanga et al. 097620* (MBK); along the roadside between Mindat and Matupi township, NMT NP, ca. 2400-2600 m, 18 May 2004, *N. Tanaka et al. 030704* (MBK).

Distribution. N India, Nepal, Bhutan, China, Thailand, Laos, Indochina.

**Lepisorus sublinearis** (Baker ex Takeda) Ching in Bull. Fan Mem. Inst. Biol. 4: 78. 1933; Ferns Burma: 127. 1946; Fl. East. Himal.: 494. 1966; Fl. Thailand 3: 512. 1989; Fl. China 2-3: 821.

2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Distribution. N India, Nepal, Bhutan, China, Thailand, Laos, Vietnam.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Leptochilus ellipticus** (Thunb.) Noot. var. **pothifolius** (Buch.-Ham. ex D.Don) X.C.Zhang, Lycophytes Ferns China: 653. 2012; Fl. China 2–3: 836. 2013.

— *Colysis pothifolia* (D.Don) C.Presl, Epimel. Bot.: 148. 1851; Ferns Burma.: 128 (1946); Fl. Thailand 3: 512. 1989.

Specimens examined. CHIN STATE. Kanpetlet Township: Yelong Pan stream, Yelong Pan village, ca. 914 m, 17 Dec. 2011, *Ling Shein Man 088003* (MBK); NMT NP, ca. 1800–2750 m, 14 Mar. 2002, *J. Murata et al. 022954* (MBK); 2230 m, 6 June 2002, *N. Tanaka et al. 023761* (MBK); along the roadside between Kanpetlet and 10 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2030 m, 11 Feb. 2012, *K. Fujikawa et al. 086525* (MBK); northern side area of Natma Taung (Mt. Victoria), NMT NP, ca. 2743 m, 19 Nov. 2011, *Ling Shein Man 087859* (MBK). Mindat Township: roadside between 16 miles basecamp from Mindat and Ohn village, on new road construction proposed to link with Natma Taung (Mt. Victoria), NMT NP, 2274 m, 28 Feb. 2014, *P. Srisanga et al. 097389* (MBK).

Distribution. India, Nepal, Bhutan, China, Japan, Thailand, Vietnam, Philippines.

**Leptochilus hemionitideus** (C.Presl) Nootboom in Blumea 42: 285. 1997; Fl. China 2–3: 834. 2013.

Distribution. India, Nepal, Bhutan, China, Japan, Thailand.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Loxogramme chinensis** Ching in Sinensia 1: 13. 1929; Ferns Burma: 129. 1946; Fl. Thailand 3: 578. 1989; Fl. China 2–3: 762. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 3 June 2002, *N. Tanaka et al. 023736* (MBK); 2355 m, 3 June 2002, *N. Tanaka et al. 023700* (MBK); 2360 m, 3 June 2002, *N. Tanaka et al. 023701* (MBK); 2370 m, 3 June 2002, *N. Tanaka et al. 023702* (MBK); 2495 m, 8 June 2002, *N. Tanaka et al. 023796* (MBK); 2585 m, 7 June 2002, *N. Tanaka et al. 023781* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053380* (MBK); along the roadside between 4 and 6 miles from Kanpetlet to Natma Taung (Mt. Victoria), NMT NP, 2340 m, 31 July 2008, *K. Fujikawa et al. 053046* (MBK); road between Kanpetlet and Mindat, 6–8 miles from Kanpetlet, NMT NP, 2400 m, 30 May 2007, *K. Fujikawa et al. 051429* (MBK); ca. 13 miles from entrance of National Park, between Kanpetlet and Mindat seasonal road, NMT NP, 2610 m, 28 May 2012, *K. Fujikawa et al. 089393* (MBK).

Distribution. India, Nepal, Bhutan, China, Thailand, Vietnam.

**Loxogramme duclouxii** Christ, Bull. Acad. Int. Géogr. Bot. 16: 140. 1907; Fl. China 2–3: 764. 2013.

Distribution. NE India, China, Korea, Japan, Thailand, N Vietnam.

Note. The species was reported by Thet Yu Nwe et al. (2019) from Natma Taung NP.

**Loxogramme involuta** (D.Don) C.Presl, Tent. Pterid.: 215. 1836; Ferns Burma: 129. 1946; Fl. East. Himal.: 495. 1966; Fl. Thailand 3: 577. 1989; Fl. China 2–3: 763. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: Saw Loung village, 19 Jan. 2011, *M. Matsumoto & Hong Mang 084077* (MBK); NMT NP, 3 June 2002, *N. Tanaka et al. 023735* (MBK); 2495 m, 8 June 2002, *N. Tanaka et al. 023795* (MBK); 2585 m, 7 June 2002, *N. Tanaka et al. 023780* (MBK); along the roadside between 3 and 7 miles from Kanpetlet to NMT NP, ca. 2286 m, 9 Jan. 2012, *Ling Shein Man 088153* (MBK); road between Kanpetlet and Mindat, ca. 6 miles from Kanpetlet, NMT NP, 2300 m, 24 May 2007, *N. Kuroiwa et al. 051216* (MBK); 6 miles from entrance of NMT NP, along unpaved road between Kanpetlet and 10 miles base camp of National Park, NMT NP, 2400 m, 21 Aug. 2013, *K. Fujikawa et al. 094134* (MBK); road through park, walking along the road 1 mile to 7 miles from Park Office, NMT NP, 2474 m, 20 Feb. 2014, *P. Srisanga et al. 097011* (MBK). Mindat Township: along the roadside between Mindat and Matupi township (56 miles N of Mindat), NMT NP, ca. 2400–2500 m, 17 May 2004, *N. Tanaka et al. 030864* (MBK); along the roadside between Mindat and Matupi township, NMT NP, ca. 2400–2600 m, 18 May 2004, *N. Tanaka et al. 030703* (MBK).

Distribution. India, Nepal, China, N Thailand, Laos, Vietnam.

**Metapolypodium manmeiense** (Christ) Ching in Acta Phytotax. Sin. 16: 29. 1978; Fl. China 2–3: 798. 2013.

— *Polypodium manmeiense* Christ in Bull. Herb. Boissier 6: 870. 1898; Ferns Burma: 129. 1946; Fl. Thailand 3: 568. 1989.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088470* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053381* (MBK); 6 miles from entrance of NMT NP, along unpaved road between Kanpetlet and 10 miles base camp of National Park, NMT NP, 2400 m, 21 Aug. 2013, *K. Fujikawa et al. 094152* (MBK).

Distribution. NE India, China, Thailand, Laos, Cambodia, Vietnam.

**Microsorium membranaceum** (D.Don) Ching in Bull. Fan Mem. Inst. Biol. 4: 309. 1933; Ferns

Burma: 128. 1946; Fl. East. Himal.: 496. 1966; Fl. Thailand 3: 526. 1989; Fl. China 2–3: 831. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: Yelong Pan village, NMT NP, 2 Sep. 2012, *M. Matsumoto 088482* (MBK); Saw Loung village, 1253 m, 7 Aug. 2008, *K. Fujikawa et al. 053211* (MBK); along foot path and unpaved new car road between Kanpetlet and Yelong Pan village, NMT NP, 1260-1435 m, 23 Aug. 2013, *K. Fujikawa et al. 094330* (MBK); between Kanpetlet and Kantar Yon village, 1390 m, 12 Sep. 2011, *H. Funakoshi et al. 085297* (MBK). Matupi Township: roadside between Matupi and Mindat, approximately 12 miles from Matupi walking downhill towards the Laemio river, NMT NP, 920 m, 12 Mar. 2014, *P. Srisanga et al. 097880* (MBK).

Distribution. Pakistan, Sri Lanka, India, Nepal, Bhutan, China, Thailand, Laos, Vietnam.

**Neolepisorus ovatus** (Wall. ex Bedd.) Ching in Acta Phytotax. Sin. 9: 99. 1964; Fl. China 2–3: 806. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: a traverse route between Kanpetlet and Yelong Pan village, 6 Dec. 2008, *M. Matsumoto 053552* (MBK); between Kanpetlet and Makyauk Ar village, NMT NP, 1475 m, 27 Feb. 2013, *S. Sangvirotjanaphat et al. 091073* (MBK); around Makyauk Ar village, NMT NP, 1520 m, 3 Dec. 2012, *K. Fujikawa et al. 090474* (MBK); along the roadside between Makyauk Ar village and Kanpetlet, NMT NP, 2000 m, 31 Dec. 2012, *Ling Shein Man 096048* (MBK).

Distribution. China, Vietnam.

Note. This is a new record for Myanmar.

**Phymatosorus scolopendria** (Burm.f.) Pic.Serm. in Webbia 28: 460. 1973; Fl. China 2–3: 828. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Microsorium scolopendria* (Burm.f.) Copel. in Occas. Pap. Bernice Pauahi Bishop Mus. 14: 112. 1929; Fl. Thailand 3: 533. 1989.

Specimens examined. CHIN STATE. Kanpetlet Township: along unpaved roadside between 2 and 3 miles from entrance of National Park, NMT NP, 2075 m, 20 Aug. 2013, *K. Fujikawa et al. 094034* (MBK).

Distribution. Sri Lanka, India, China, Japan (Ryukyu Islands), Thailand, Vietnam Malaysia, Philippines, Papua New Guinea; Africa, Australia, Pacific islands (Polynesia).

**Platyserium wallichii** Hook. in Gard. Chron. 1585: 765. 1858; Ferns Burma: 126. 1946; Fl. Thailand 3: 488. 1989; Fl. China 2–3: 796. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.



Specimens examined. CHIN STATE. Kanpetlet Township: roadside on Kanpetlet to Saw road, approximately 6 miles from Kanpetlet, NMT NP, 739 m, 22 Feb. 2014, *P. Srisanga et al. 097108* (MBK); NMT NP, ca. 790 m, 27 Apr. 2003, *J. Murata et al. 029723* (MBK); ca. 2-4 miles from Kanpetlet, between Kanpetlet and Saw, 850-1450 m, 2 June 2012, *K. Fujikawa et al. 089678* (MBK). MAGWAY REGION. Saw Township: Kangyi village, ca. 485 m, 25 June 2009, *N. Tanaka & T. Yukawa 081168* (MBK).

Distribution. E India, China, Thailand, Malaysia.

**Polypodiastrum argutum** (Wall. ex Hook.) Ching in Acta Phytotax. Sin. 16: 28. 1978; Fl. China 2–3: 799. 2013.

— *Polypodium argutum* Wall. ex Hook., Sp. Fil. 5: 32 1864; Ferns Burma: 128. 1946; Fl. East. Himal.: 496. 1966; Fl. Thailand 3: 572. 1989.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088469* (MBK); along unpaved roadside between 2 and 3 miles from entrance of National Park, NMT NP, 2075 m, 20 Aug. 2013, *K. Fujikawa et al. 094028* (MBK); *094055* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053388* (MBK); 6 miles from entrance of NMT NP, along unpaved road between Kanpetlet and 10 miles base camp of National Park, NMT NP, 2400 m, 21 Aug. 2013, *K. Fujikawa et al. 094151* (MBK).

Distribution. Nepal, Bhutan, NE India, China, Thailand.

**Polypodiodes amoena** (Wall. ex Mett.) Ching in Acta Phytotax. Sin. 16: 27. 1978; Fl. China 2–3: 803. 2013.

— *Goniophlebium amoenum* (Wall. ex Mett.) Bedd., Ferns Brit. India 1: 5. 1865; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Polypodium amoenum* Wall. ex Mett., Farngatt. Polypod.: 80. 1857; Fl. East. Himal.: 496. 1966; Fl. Thailand 3: 569. 1989.

— *Polypodium amoenum* Wall., Numer. List: no. 290. 1829; Ferns Burma: 128. 1946.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088473* (MBK); NMT NP, 6 June 2002, *N. Tanaka et al. 023758* (MBK); 2395 m, 3 June 2002, *N. Tanaka et al. 023709* (MBK); along the roadside between 4 and 6 miles from Kanpetlet to Natma Taung (Mt. Victoria), NMT NP, 2340 m, 31 July 2008, *K. Fujikawa et al. 053041* (MBK); 6 miles from entrance of NMT NP, along unpaved road between Kanpetlet and 10 miles base camp of National Park, NMT NP, 2400 m, 21 Aug. 2013, *K. Fujikawa et al. 094153* (MBK); road between Kanpetlet and Mindat, 10-12 miles from Kanpetlet, NMT NP, 2677 m, 29 May 2007, *K. Fujikawa et al. 051404* (MBK). Mindat Township: 37 miles from Mindat, between Mindat and Matupi (Mindat-Matupi Road), NMT NP, 2450-2545 m, 31 Aug. 2013, *K. Fujikawa et al. 094734* (MBK).

Distribution. India, Nepal, Bhutan, China, Thailand, Laos, Vietnam.

**Polypodiodes lachnopus** (Wall. ex Hook.) Ching in Acta Phytotax. Sin. 16: 27. 1978; Fl. China 2–3: 802. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, ca. 1500 m, 4 Sep. 2012, *Ling Shein Man 091685* (MBK); along unpaved roadside between 2 and 3 miles from entrance of National Park, NMT NP, 2075 m, 20 Aug. 2013, *K. Fujikawa et al. 094027* (MBK).

Distribution. N India, Nepal, Bhutan, China.

Note. This is a new record for Myanmar.

**Pyrrosia flocculosa** (D. Don) Ching in Bull. Chin. Bot. Soc. 1: 66. 1935; Ferns Burma: 129. 1946; Fl. East. Himal.: 498. 1966; Fl. Thailand 3: 503. 1989; Fl. China 2–3: 792. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Kanpetlet Township: NMT NP, 9 June 2002, *N. Tanaka et al. 023813* (MBK). Matupi Township: Pong Thsala waterfall on Laemio river, approximately 3 miles from Tisawn village, NMT NP, 1283 m, 8 Mar. 2014, *P. Srisanga et al. 097690* (MBK).

Distribution. Pakistan, India, Nepal, Bhutan, Bangladesh, China, Thailand, Vietnam.

**Pyrrosia mannii** (Gies.) Ching in Bull. Chin. Bot. Soc. 1: 55. 1935; Fl. East. Himal.: 498. 1966; Fl. Thailand 3: 502. 1989; Fl. China 2–3: 803. 2013; Lindsay & Middleton, Ferns of Thailand, Laos and Cambodia. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Mindat Township: Thaing Teet Village, NMT NP, 1672 m, 9 Jan. 2014, *Law Shine 098034* (MBK). Matupi Township: roadside between Matupi and Mindat, approximately 12 miles from Matupi walking downhill towards the Laemio river, NMT NP, 920 m, 12 Mar. 2014, *P. Srisanga et al. 097887* (MBK); road from Matupi to Palatwa, NMT NP, 1821 m, 10 Mar. 2014, *P. Srisanga et al. 097801* (MBK).

Distribution. India, Nepal, Bhutan, China, Thailand, Laos, Vietnam.

**Pyrrosia mollis** (Kunze) Ching in Bull. Chin. Bot. Soc. 1: 53. 1935; Ferns Burma: 129. 1946; Fl. East. Himal.: 498. 1966; Fl. Thailand 3: 501. 1989.

Specimens examined. CHIN STATE. Kanpetlet Township: water resort area, near Kanpetlet, ca. 1828 m, 4 Jan. 2012, *Ling Shein Man 088097* (MBK).

Distribution. Sri Lanka, Himalaya, SW China, Thailand, Indochina.

**Pyrrosia stenophylla** (Bedd.) Ching in Bull. Chin. Bot. Soc. 1: 55. 1935; Fl. China 2–3: 794. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: along foot path and unpaved new car road between Kanpetlet and Yelong Pan village, NMT NP, 1260-1435 m, 23 Aug. 2013, *K. Fujikawa et al. 094335* (MBK).

Distribution. India, Nepal, Bhutan, China.

**Selliguea ebenipes** (Hook.) S.Lindsay, *Edinburgh J. Bot.* 66: 356. 2009; *Fl. China* 2–3: 781. 2013.

Distribution. Nepal, Bhutan, NE India, China, Thailand.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Selliguea incisoscrenata** (Ching ex W.M.Chu & S.G.Lu) S.G.Lu, Hovenkamp & M.G.Gilbert, *Fl. China* 2–3: 782. 2013.

Distribution. China.

Note. The species was reported by Phyto Kay Khine et al. (2017) from Natma Taung NP.

**Selliguea oxyloba** (Wall. ex Kunze) Fraser-Jenk., *Taxon. Revis. Indian Subcontinental Pteridophytes* 44. 2008; *Fl. China* 2–3: 779. 2013; Lindsay & Middleton, *Ferns of Thailand, Laos and Cambodia*. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Crypsinus oxylobus* (Wall. ex Kunze) Sledge in *Bull. Brit. Mus. (Nat. Hist.) Bot.* 2: 145. 1960; *Fl. Thailand* 3: 559. 1989.

— *Phymatodes oxyloba* (Wall. ex Kunze) C.Presl ex Ching in *Contr. Inst. Bot. Natl. Acad. Peiping* 2: 67. 1933; *Ferns Burma*: 127. 1946; *Fl. East. Himal.*: 492. 1966.

Specimens examined. CHIN STATE. Kanpetlet Township: trail between 4 and 6 miles from entrance of National Park, NMT NP, 28 Aug. 2012, *M. Matsumoto 088466* (MBK); along the walking trail between Kanpetlet and Yelong Pan village, NMT NP, 1552 m, 2 Aug. 2008, *K. Fujikawa et al. 053099* (MBK); along the roadside between Kanpetlet and 16 miles base camp of Natma Taung (Mt. Victoria), NMT NP, 2300 m, 11 Aug. 2008, *K. Fujikawa et al. 053389* (MBK); 6 miles from entrance of NMT NP, along unpaved road between Kanpetlet and 10 miles base camp of National Park, NMT NP, 2400 m, 21 Aug. 2013, *K. Fujikawa et al. 094136* (MBK).

Distribution. N India, Nepal, China, Thailand, Vietnam.

**Selliguea rhynchophylla** (Hook.) Fraser-Jenk., *Taxon. Revis. Indian Subcontinental Pteridophytes* 48. 2008; *Fl. China* 2–3: 775. 2013; Lindsay & Middleton, *Ferns of Thailand, Laos and Cambodia*. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

— *Crypsinus rhynchophyllus* (Hook.) Copel., *Gen. Fil.*: 20. 1947; *Fl. Thailand* 3: 556. 1989.

— *Phymatodes rhynchophylla* (Hook.) Ching in *Contr. Inst. Bot. Natl. Acad. Peiping* 2: 69. 1933; *Ferns Burma*: 127. 1946.

Specimens examined. CHIN STATE. Matupi Township: road from Matupi to Palatwa, NMT NP, 1821 m, 10 Mar. 2014, *P. Srisanga et al. 097799* (MBK).

Distribution. N India, Nepal, China, Thailand, Laos, Cambodia, Vietnam, Indonesia, Philippines.

**Tomophyllum donianum** (Spreng.) Fraser-Jenk. & Parris, *Taxon. Revis. Indian Subcontinental Pteridophytes* 75. 2008; *Fl. China* 2–3: 850. 2013.

Specimens examined. CHIN STATE. Kanpetlet Township: along the walking trail between 16 miles base camp of Natma Taung and summit of Natma Taung (Mt. Victoria), NMT NP, 2260 m, 13 Aug. 2008, *K. Fujikawa et al. 053486* (MBK); 6 miles from Kanpetlet to NMT NP, ca. 2286 m, 9 Jan. 2012, *Ling Shein Man 088168* (MBK); road through park, walking along the road 1 mile to 7 miles from Park Office, NMT NP, 2474 m, 20 Feb. 2014, *P. Srisanga et al. 097025* (MBK).

Distribution. N India, Nepal, Bhutan, China.

**Tricholepidium normale** (D. Don) Ching in *Acta Phytotax. Geobot.* 29: 43. 1978; *Fl. China* 2–3: 805. 2013.

— *Neocheiropteris normalis* (D. Don) Tagawa in *J. Jap. Bot.* 27: 217. 1952; *Fl. Thailand* 3: 523. 1989; Lindsay & Middleton, *Ferns of Thailand, Laos and Cambodia*. 2012 onwards, <http://rbg-web2.rbge.org.uk/thaiferns/> Retrieved Aug. 1, 2016.

Specimens examined. CHIN STATE. Matupi Township: track off road, approximately 2 miles along track from Matupi to Palatwa, on right to Chan Pyang village, NMT NP, 1676 m, 11 Mar. 2014, *P. Srisanga et al. 097817* (MBK).

Distribution. India, Nepal, Bhutan, China, Thailand, Vietnam, Malaysia, Indonesia.

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## Gymnosperms

Kazumi Fujikawa<sup>1</sup>

A total of 76 taxa of Gymnosperms belonging to nine families was reported from Myanmar (Kress et al. 2003, Yang et al. 2020). In Natma Taung, five families, six genera and seven species were recorded and enumerated below. Family order was followed by Christenhusz et al. (2011), and genera and species in a family were arranged in alphabetical order. Localities of each species listed in IUCN Red List as CR, EN and VU were excluded.

### Cycadaceae Pers.

Kazumi Fujikawa

**Cycas pectinata** Buch.-Ham. in Mem. Wern. Nat. Hist. Soc. 5: 322. 1826; Kurz, Forest Fl. Burma 2: 503. 1877; Hook.f., Fl. Brit. India 5: 657. 1890; Smitinand, Fl. Thailand 2(3): 190. 1972; Hill & Yang in Brittonia 49: 56. 1999; Chen & Stevenson in Fl. China 4: 7. 1999; Kress et al. in Contr. U.S. Natl. Herb. 45: 34. 2003.

Specimens examined. CHIN STATE. Matupi Township: 1289 m, 14 March 2014, *P. Srisanga et al.* 097978 (MBK).

Distribution. India, Nepal, Bhutan, Bangladesh, China, Thailand, Laos, Cambodia, Vietnam.

### Gnetaceae Lindl.

Akihiro Seo<sup>2</sup>

**Gnetum latifolium** Blume var. **funiculare** (Blume) Markgr. in Bull. Jard. Bot. Buitenzorg sér. 3, 10: 463. 1930; Markgraf, Fl. Malesiana I 4: 343. 1951; Phengklai in Fl. Thailand 2 (3): 210. 1975.

— *Gnetum funiculare* Blume in Tijdschr. Natuurl. Gesch. Physiol. 1: 162. 1834; Kurz, Forest Fl. Burma 2: 496. 1877; Hook.f., Fl. Brit. India 5: 643. 1890.

— *Gnetum kinglanum* Gamble in Kew Bull. 92. 1915.

Specimens examined. CHIN STATE. Kanpetlet Township: Saw Loung village, 23 Apr. 2003, *J. Murata et al.* 029118a (MBK); 029118b (MBK); near Kanpetlet, 1000-1200 m, 3 Mar. 2004, *N. Kuroiwa et al.* 030460 (MBK); along the roadside between Maswati road and Kanpetlet, 1100 m, 21 June 2013, *Ling Shein Man* 092837 (MBK).

Distributions. Thailand, Malaysia, Indonesia.

**Gnetum montanum** Markgr. in Bull. Jard. Bot. Buitenzorg sér. 3, 10: 466. 1930; Phengklai in Fl. Thailand 2 (3): 209. 1975; Fu et al. in Fl. China 4: 104. 1999; Kress et al. in Contr. U.S. Natl.

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Herb. 45: 34. 2003.

Specimens examined. CHIN STATE. Kanpetlet Township: between Kanpetlet and Saw, ca. 914 m, 9 Apr. 2011, *Ling Shein Man 087322* (MBK); ca. 4 miles from Kanpetlet, 1000 m, 25 May 2007, *N. Kuroiwa et al. 051232* (MBK); between Kanpetlet and Parkown village, 1155 m, 7 Sep. 2011, *Hong Mang et al. 085185* (MBK); along the trail between Kanpetlet and Yelong Pan village, 1450-1262 m, 1 June 2012, *K. Fujikawa et al. 089625* (MBK); near Kanpetlet, ca. 1600 m, 20 May 2004, *N. Tanaka et al. 030905* (MBK). Matupi Township: roadside between Matupi and Mindat, approximately 12 miles from Matupi walking downhill towards the Laemio river, 920 m, 12 Mar. 2014, *P. Srisanga et al. 097877* (MBK).

Distribution. Nepal, Bhutan, NE India, Bangladesh, S China, Thailand, Laos, Cambodia, Vietnam.

### **Pinaceae Lind.**

Kazumi Fujikawa

**Pinus kesiya** Royle ex Gordon in Loud. Gard. Mag. 16: 8. 1840; Kurz, Forest Fl. Burma 2: 499. 1877; Hook.f., Fl. Brit. India 5: 652. 1890; Phengkklai in Fl. Thailand 2(3): 194. 1972; Fu et al. in Fl. China 4: 15. 1999; Kress et al. in Contr. U.S. Natl. Herb. 45: 35. 2003.

—*Pinus insularis* Endl. var. *khasyana* (Griffiths) Silba in Phytologia 68: 51. 1990.

Specimens examined. CHIN STATE. Kanpetlet Township: around Oak Pho village, 1600 m, 3 Dec. 2012, *K. Fujikawa et al. 090496* (MBK); NMT NP, ca. 1750-1850 m, 8 Mar. 2002, *J. Murata et al. 022422* (MBK); ca. 2300-2450 m, 4 June 2002, *N. Tanaka et al. 023329* (MBK); ca. 2698 m, 6 Mar. 2006, *H. Nagamasu et al. 035542* (MBK); Old Town area, ca. 1828 m, 14 Feb. 2011, *Ling Shein Man 087108* (MBK); a road from entrance of trail to Natma Taung (Mt. Victoria) to Mindat, 2100-2200 m, 29 Feb. 2004, *N. Kuroiwa et al. 030355* (MBK); along the roadside between an entrance of trail to Natma Taung (Mt. Victoria) and Chin Resort Guest House, 2310 m, 24 Mar. 2006, *K. Fujikawa & A. Nomachi 035936* (MBK); around 10 miles base camp of Natma Taung (Mt. Victoria), 2710 m, 12 Feb. 2012, *K. Fujikawa et al. 086590* (MBK). Mindat Township: along the roadside between 35 miles and 56 miles (Mindat-Matupi car road), 2400 m, 24 July 2013, *Mu Mu Aung & Law Shine 092702* (MBK); roadside 36 miles from Mindat, walking back towards Mindat and 16 miles basecamp, 2470 m, 2 Mar. 2014, *P. Srisanga et al. 097469* (MBK).

Distribution. NE India, China, Thailand, Laos, Vietnam, Philippines.

### **Podocarpaceae Endl.**

Kazumi Fujikawa

**Podocarpus neriifolius** D. Don, Descr. Pinus 2: 21. 1824; Hook.f., Fl. Brit. India 5: 649. 1890; Phengkklai in Fl. Thailand 2(4): 199. 1975; Fu et al. in Fl. China 4: 82. 1999; Kress et al. in Contr. U.S. Natl. Herb. 45: 35. 2003.

Specimens examined. CHIN STATE. Matupi Township: road from Matupi to Palatwa, 1844 m,



10 Mar. 2014, *P. Srisanga et al. 097779* (MBK).

Distribution. Nepal, Bhutan, NE India, China, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, Papua New Guinea, Philippines; Pacific Islands.

### Taxaceae S.F.Gray

*Cephalotaxus* by Kazumi Fujikawa, *Taxus* by Yumiko Baba<sup>3</sup>

***Cephalotaxus harringtonii*** (Knight ex J.Forbes) K.Koch in *Dendrologie* 2: 102. 1873; Lang et al. in *Amer. J. Pl. Sci.* 2: 500. 2011; Lang et al. in *Phytotaxa* 84: 13. 2013.

— *Taxus harringtonii* Knight ex J.Forbes, *Pinet. Woburn.*: 217. 1839 [as *harringtonia*].

— *Cephalotaxus mannii* Hook.f., *Hooker's Icon. Pl.* 16: t. 1523. 1886; Hook.f., *Fl. Brit. India* 5: 647. 1890; Kress et al. in *Contr. U.S. Natl. Herb.* 45: 33. 2003.

Specimens examined. CHIN STATE. Kanpetlet Township: road between Kanpetlet and Mindat, ca. 4 miles from Kanpetlet, 1997 m, 13 Feb. 2007, *K. Fujikawa et al. 051002* (MBK); ca. 20 miles from Kanpetlet, 2373 m, 21 Feb. 2007, *K. Fujikawa et al. 050079* (MBK); 7 miles from Kanpetlet to Natma Taung (Mt. Victoria), ca. 2438 m, 9 Jan. 2012, *Ling Shein Man 088180* (MBK); northern side area of Natma Taung (Mt. Victoria), ca. 2743 m, 19 Nov. 2011, *Ling Shein Man 087833* (MBK). Matupi Township: between Hteesaung village and Pong Thsala waterfall, 1160 m, 19 July 2013, *Mu Mu Aung et al. 092577* (MBK); Pong Thsala waterfall on Laemio river, approximately 3 miles from Tisawn village, 1283 m, 8 Mar. 2014, *P. Srisanga et al. 097655* (MBK); track off road, approximately 2 miles along track from Matupi to Palatwa, on right to Chan Pyang village, 1676 m, 11 Mar. 2014, *P. Srisanga et al. 097831* (MBK).

Distribution. NE India, China, Korea, Japan, Thailand, Laos, Vietnam, Malaysia.

***Taxus wallichiana*** Zucc. var. ***mairei*** (Lemée & H.Lév.) L.K.Fu & Nan Li in *Novon* 7: 263. 1997; Fu et al. in *Fl. China* 4: 91. 1999.

— *Taxus baccata* L., *Sp. Pl.* 2: 1040. 1753; Hook.f., *Fl. Brit. India* 5: 622. 1890 pro parte; Grieson & Long, *Fl. Bhutan* 1(1): 56. 1983 pro parte; Kress et al. in *Contr. U.S. Natl. Herb.* 45: 35. 2003.

— *Taxus wallichiana* Zucc. in *Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss.* 3: 803, pl. 5. 1843; Kress et al. in *Contr. U.S. Natl. Herb.* 45: 35. 2003.

Specimens examined. CHIN STATE. Kanpetlet Township: 20 Jan. 2013, *Law Shine 096469* (MBK); 1700 m, 18 Jan. 2011, *M. Matsumoto 084072* (MBK); 2210 m, 21 Mar. 2006, *K. Fujikawa & A. Nomachi 035837* (MBK); *035840* (MBK); 2360 m, 24 Feb. 2007, *C. Mouri & T. Watanabe 050113* (MBK); 2400-2600 m, 29 Feb. 2004, *N. Kuroiwa et al. 030342* (MBK); ca. 2500-2750 m, 6 July 2002, *N. Tanaka et al. 023601* (MBK); 2500-2750 m, 3 Dec. 2002, *J. Murata et al. 025483* (MBK); 2600 m, 16 Aug. 2008, *K. Fujikawa et al. 053535* (MBK); 2610 m, 28 May 2012, *K. Fujikawa et al. 089381* (MBK); 2639 m, 25 Feb. 2014, *P. Srisanga et al. 097323* (MBK); ca. 2656 m, 4 Mar. 2006, *H. Nagamasu et al. 035400* (MBK); 2680 m, 28

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Aug. 2013, *K. Fujikawa et al. 094577* (MBK); ca. 2700 m, 11 Mar. 2002, *J. Murata et al. 022477* (MBK); 20 Feb. 2012, *K. Fujikawa et al. 086944* (MBK); ca. 2750 m, 28 June 2009, *N. Tanaka & T. Yukawa 081383* (MBK). Mindat Township: 2480 m, 1 Mar. 2014, *P. Srisanga et al. 097425* (MBK); 2543 m, 5 Mar. 2014, *M. Norsaengsri et al. 097597* (MBK).

Distribution. India, Bhutan, China, Laos, Vietnam.

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**A.** View of Natma Taung from trekking path to the summit (Dec. 25, 2012).  
**B.** View of Chin hills from the summit of Natma Taung (Jan. 23, 2018).  
**C.** Trekking path to the summit of Natma Taung (Sep. 14, 2013).



- A. Summit of Natma Taung (Nov. 26, 2018).  
 B. Kanpetlet, gateway to Natma Taung National Park (Aug. 13, 2008).  
 C. Gate of the Natma Taung National Park office, Kanpetlet.  
 D. Staff office of Natma Taung National Park, Kanpetlet.  
 E. Orchid nursery for conservation in the Natma Taung National Park office.  
 F. Education center of Natma Taung National Park.



- A.** On the way to Mindat (Dec. 12, 2012).  
**B.** Vegetation survey in evergreen forest, Natma Taung National Park (Feb. 16, 2007).  
**C.** Collecting specimens along the roadside in Natma Taung National Park (May 25, 2012).  
**D.** Collecting specimens in Mindat (Mar. 11, 2014).  
**E.** International botanical expedition at Pong Thsala waterfall, Matupi (Mar. 8, 2014).  
**F.** Drying specimens by rangers of Natma Taung National Park (Sep. 11, 2012).



- A. View of Saw at the foot of Natma Taung in rainy season (Aug. 4, 2018).  
 B. View of Saw in dry season (Dec. 11, 2012).  
 C. Saw river at Saw (May 9, 2010).  
 D. Seasonally dry forest along the roadside between Mindat and Matupi (Mar. 9, 2014, photo by Dr. Michele Rodda).  
 E. *Bauhinia variegata*, flowering in dry season at Matupi (Mar. 13, 2014, photo by Dr. Michele Rodda).  
 F. Dry dipterocarp forest along the roadside between Saw and Kanpetlet (May 25, 2007).



- A. Secondary forest around village (Nov. 27, 2018).  
 B. Administration office in British rule in Burma at Kanpetlet (Nov. 26, 2018).  
 C. *Alnus nepalensis*, major component species in the secondary forest at Kanpetlet (Dec. 2, 2016).  
 D. *Lyonia ovalifolia*, growing mountain slopes ranging from ca. 1300 m around Kanpetlet to the summit of Natma Taung at altitude of 3050 m (Sep. 24, 2013).  
 E. *Engelhardia spicata* var. *integra*, common growing on mountain slopes (Dec. 11, 2012).



- A. *Pinus kesiya* forest on south facing slopes of Natma Taung (Aug. 9, 2016).  
 B. *Globba wardii*, growing forest floor of *Pinus kesiya* in rainy season (Aug. 20, 2013).  
 C. Temperate broad-leaved forest of Natma Taung (May 24, 2007).  
 D. Attractive red flowers of *Rhododendron arboreum* of Natma Taung in dry season (Feb. 25, 2012).





- A.** Scattered forest composed of *Quercus semecarpifolia* and *Rhododendron arboreum* around the summit of Natma Taung (May 28, 2007).
- B.** *Roscoea australis*, flowering at montane meadow of Natma Taung (June 11, 2012).
- C.** *Anemone obtusiloba* and *Potentilla montisvictoriae*, flowering at montane meadow of Natma Taung (May 28, 2007).
- D.** *Rhodiola chrysanthemifolia*, growing on rocks at the summit of Natma Taung (Sep. 14, 2013).
- E.** *Rhododendron burmanicum*, growing on slopes near the summit of Natma Taung (May 8, 2010).



A. *Pteridium revolutum* [Dennstaedtiaceae].

C. *Coniogramme fraxinea* [Pteridaceae].

E. *Diplazium bellum* [Athyraceae] (photo by Dr. Michele Rodda).

B. *Adiantum philippense* [Pteridaceae].

D. *Asplenium yoshinagae* [Aspleniaceae].



**A.** *Arthromeris lehmannii* [Polypodiaceae].

**B.** *Lepisorus bicolor* [Polypodiaceae].

**C.** *Leptochilus ellipticus* var. *pothifolius* [Polypodiaceae] (photo by Dr. Michele Rodda).

**D.** *Microsorium membranaceum* [Polypodiaceae].

**E.** *Platycerium wallichii* [Polypodiaceae].



A. *Cycas pectinata* [Cycadaceae].

C. *Gnetum montanum* [Gnetaceae].

E. *Pinus kesiya* [Pinaceae] (photo by Dr. Michele Rodda).

B. *Gnetum latifolium* var. *funiculare* [Gnetaceae].

D. *Pinus kesiya* [Pinaceae].

## I n d e x

A		B	
<i>Acrophorus stipellatus</i>	82	<i>Bolbitis sinensis</i>	78
<i>Acystopteris tenuisecta</i>	68	<i>Botrychium lanuginosum</i>	54
<i>Adiantum capillus-veneris</i>	58		
<i>Adiantum edgeworthii</i>	58	C	
<i>Adiantum malesianum</i>	59	<i>Calciphlopteris ludens</i>	60
<i>Adiantum monochlamys</i>	59	<i>Cephalotaxus harringtonii</i>	105
<i>Adiantum philippense</i>	59	<i>Cephalotaxus mannii</i>	105
<i>Aglaomorpha coronans</i>	90	<i>Cheilanthes farinosa</i>	60
<i>Angiopteris helferiana</i>	54	<i>Cheilanthes tenuifolia</i>	61
<i>Anisocampium cumingianum</i>	73	<i>Colysis pothifolia</i>	94
<i>Anisocampium cuspidatum</i>	74	<i>Coniogramme fraxinea</i>	61
<i>Antrophyum callifolium</i>	60	<i>Crepidomanes latealatum</i>	55
<i>Arachniodes henryi</i>	78	<i>Crepidomanes minutum</i>	55
<i>Arachniodes simulans</i>	78	<i>Crypsinus oxylobus</i>	99
<i>Araiostegia faberiana</i>	89	<i>Crypsinus rhynchophyllus</i>	99
<i>Araiostegia pulchra</i>	89	<i>Ctenitis decurrentipinnata</i>	79
<i>Arthromeris lehmannii</i>	90	<i>Ctenitis rhodolepis</i>	79
<i>Arthromeris wallichiana</i>	90	<i>Ctenitis subglandulosa</i>	79
<b>Aspleniaceae</b>	68	<b>Cycadaceae</b>	103
<i>Asplenium aethiopicum</i>	68	<i>Cycas pectinata</i>	103
<i>Asplenium ensiforme</i>	68	<i>Cyclosorus articulatus</i>	71
<i>Asplenium excisum</i>	70	<i>Cyclosorus dentatus</i>	71
<i>Asplenium indicum</i>	69	<i>Cyclosorus nudatus</i>	73
<i>Asplenium planicaule</i>	69	<i>Cyclosorus procerus</i>	72
<i>Asplenium tenuifolium</i>	70	<i>Cyclosorus truncatus</i>	72
<i>Asplenium unilaterale</i> var. <i>rahaoense</i>	70	<i>Cyrtomium hookerianum</i>	86
<i>Asplenium yoshinagae</i>	70	<b>Cystopteridaceae</b>	67
<b>Athyriaceae</b>	73	<i>Cystopteris tenuisecta</i>	68
<i>Athyrium anisopterum</i>	74		
<i>Athyrium atkinsonii</i>	74	D	
<i>Athyrium biserrulatum</i>	74	<b>Davalliaceae</b>	89
<i>Athyrium boryanum</i>	76	<i>Davallia dareiformis</i>	91
<i>Athyrium dissitifolium</i>	74	<b>Dennstaedtiaceae</b>	57
<i>Athyrium drepanopterum</i>	75	<i>Deparia boryana</i>	75
<i>Athyrium falcatum</i>	75	<i>Deparia wilsonii</i>	76
<i>Athyrium mackinnoniorum</i>	75	<i>Diplazium bellum</i>	76
<i>Athyrium roseum</i>	75	<i>Diplazium esculentum</i>	76
		<i>Diplazium maximum</i>	76

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Diplazium muricatum	77	Gymnogrammitis dareiformis	91
Diplazium spectabile	77	<i>Gymnopteris vestita</i>	63
Diplazium succulentum	77	<b>Gymnosperms</b>	103
<i>Doryopteris ludens</i>	60		
Drynaria delavayi	91	<b>H</b>	
Drynaria parishii	91	Haplopteris amboinensis	61
Drynaria propinqua	91	Haplopteris flexuosa	62
<b>Dryopteridaceae</b>	78	Haplopteris taeniophylla	63
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## **Taxonomic Enumeration of Natma Taung National Park Vol. 1.**

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