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Biological Inventory in Myanmar: Special Attention to the Flora of Myanmar

Mitrephora winitii Craib. (Annonaceae)

Dr. Mu Mu Aung (Research Officer, Forest Research Institute)
Dr. Nobuyuki Tanaka (Project Leader)
(Department of Botany, National Museum of Nature and Science)
Dr. Shuichiro Tagane
(Center for Asian Conservation Ecology, Kyushu University)

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မြန်မာနိုင်ငံအတွင်းရှိ ဇီဝမျိုးစုံမျိုးကွဲများ သယ်ဇာတ စာရင်းကောက်ယူခြင်းမှ အပင်မျိုးစုံမျိုးကွဲများ၏ မှတ်တမ်းအသစ်၊ မျိုးစိတ်အသစ်များ သုတေသနပြု လေ့လာဖော်ထုတ် မှတ်တမ်းတင်ခြင်း

ဒေါက်တာမူမူအောင် (သုတေသနအရာရှိ၊ သစ်တောသုတေသနဌာန)
Dr. Nobuyuki Tanaka (Project Leader)
(Department of Botany, National Museum of Nature and Science, Japan)
Dr. Shuichiro Tagane
(Center for Asian Conservation Ecology, Kyushu University)

စာတမ်းအကျဉ်း

မြန်မာနိုင်ငံသည် တောင်ဖက်စွန်းပင်လယ်ကုန်းတွင်းပိုင်း အနှံဒါမန်ကျွန်းစုများမှ မြောက်ဖက်စွန်း ပင်လယ်ရေမျက်နှာပြင်အမြင့် မီတာ ၅၈၁၁ ရှိသည့် ခါကာဘိုရာဇီ တောင်ပေါ် ဆက်စပ် သစ်တောများထိ အလွန်ကျယ်ပြန့်ပြီး ဇီဝမျိုးစုံမျိုးကွဲများ ပေါများကြွယ်ဝဆုံး နိုင်ငံအနေဖြင့် အရှေ့တောင်အာရှနိုင်ငံများကြားတွင် တည်ရှိနေသော်လည်း သိပ္ပံနည်းကျ မှတ်တမ်းတင်ခြင်းဆိုင်ရာ အသေးစိတ်အချက်အလက်များ၊ သုတေသနအကျိုးရလဒ်များ၏ မှတ်တမ်းများစုစည်းမှု အားနည်းနေသေးကြောင်း လေ့လာတွေ့ရှိရ ပါသည်။ ဇီဝမျိုးစုံမျိုးကွဲများ စာရင်းကောက်ယူ လေ့လာမှတ်တမ်းတင်ခြင်းဆိုင်ရာ သုတေသနများကို ခေတ်မှီဖွံ့ဖြိုး တိုးတက်စေရန်အလို့ငှာ သစ်တောဦးစီးဌာနနှင့် ဂျပန်နိုင်ငံ၊ သဘာဝသိပ္ပံအမျိုးသားပြတိုက် တို့ပူးပေါင်း၍ ၂၀၁၆ ခုနှစ် မှ ၂၀၂၁ ခုနှစ်အထိ နားလည်မှု စာချွန်လွှာ ရေးထိုးပြီး ဆောင်ရွက် လျက်ရှိပါသည်။ ၂၀၁၆ ခုနှစ်နှင့် ၂၀၁၇ ခုနှစ်အတွင်း ကွင်းဆင်း လေ့လာဆောင်ရွက်ခဲ့သည့် ဒေသများဖြစ်သည့် ထမံသီဘေးမဲ့တော၊ အင်းတော်ကြီး ဘေးမဲ့တော၊ တနင်္သာရီ သဘာဝကြိုးဝိုင်း ကာကွယ်တော၊ လန်ပိအဏ္ဏဝါ အမျိုးသားဥယျာဉ် အတွင်းရှိ အပင်မျိုးစိတ်များ၏ မျိုးစုံမျိုးကွဲများကို စာရင်းကောက်ယူ လေ့လာမှတ်တမ်းတင်နိုင်ခဲ့ပါသည်။ ဤသုတေသနတွင် အပင်မျိုးရင်း ၁၁ ခုမှ မျိုးစိတ် ၁၆ မျိုးအား မြန်မာနိုင်ငံ၏ မှတ်တမ်းအသစ်အဖြစ် သုတေသနပြု လေ့လာမှတ်တမ်းတင် နိုင်ခဲ့ပါသည်။ ဤသုတေသနရလဒ်များသည် နောင်တွင်ထုတ်ဝေမည့် မြန်မာနိုင်ငံ၏ အပင်မျိုးစုံမျိုးကွဲများ မှတ်တမ်းစာအုပ် ပြန်လည်မွမ်းမံပြင်ဆင်ခြင်းနှင့် **Flora of Myanmar** စာအုပ် ထုတ်ဝေခြင်းအတွက် အလွန်အရေးပါသော မှတ်တမ်းအသစ်များ၊ သတင်းအချက် အလက်များ အဖြစ် ပါဝင်နေမည် ဖြစ်ပါသည်။

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Dr. Nobuyuki Tanaka (Project Leader)

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Dr. Shuichiro Tagane

(Center for Asian Conservation Ecology, Kyushu University)

Abstract

Myanmar is known as the “floristic blank” among Continental Southeast Asian countries, yet it embraces rich floral and faunal diversity from the mangrove forests and coral reefs of the Andaman Islands in the south, to the snow-capped peaks of Mt. Kakaboradzi (5,881 m) in the north, the highest mountain in Southeast Asia. However, an inventory in Myanmar is far from being complete with only limited specimens to be found in the world’s herbaria. However, many regions in Myanmar still lack sufficient floristic inventories. To help improve this situation, the National Museum of Nature and Science (Japan) and Forest Department, Ministry of Natural Resources and Environmental Conservation (Myanmar), have newly started an inventory project to provide contributions to the Flora and Fauna of Myanmar since 2016. This joint research project has been carrying out from 2016 through 2021 under the memorandum of Understanding between Forest Department and National Museum of Nature and Science (NMNS), Japan. Field explorations were carried out in the Htamanthi Wildlife Sanctuary, Sagaing Region, Indawgyi Wildlife Sanctuary, Kachin State, Tanintharyi Nature Reserve, in the vicinity of Dawei (formerly Tavoy), and Lampi Island Marine National Park, Tanintharyi Region, in 2016 and 2017. As the results of fundamental inventories for the contributions to the knowledge on the flora of Myanmar, nine taxa of monocotyledonous plants representing four families and seven taxa of dicotyledonous plants representing seven families were newly recorded and also some new species were discovered. These data would be very important for the materials to the revised flora of Myanmar in the future.

Keywords: *inventory, diversity, flora, new record, Myanmar*

Biological Inventory in Myanmar: Special Attention to the Flora of Myanmar

1. Introduction

The Indo-Chinese region is known as "Indo-Burma Hotspot" for its richness of biodiversity, however, the diversity is rapidly decreasing because of the deforestation and shifting-cultivation etc. Myanmar is one of these regions. On the other hand, with its wealth of plant diversity, Myanmar is one of the most botanically fascinating countries in the world. However nearly half a century has elapsed since the British botanists collected the specimens. Almost specimens are out of date to clarify the present species diversity of Myanmar.

Myanmar is known as the "floristic blank" among Continental Southeast Asian countries, yet it embraces rich floral and faunal diversity from the mangrove forests and coral reefs of the Andaman Islands in the south, to the snow-capped peaks of Mt. Kakaboradzi (5,881 m) in the north, the highest mountain in Southeast Asia. However, an inventory in Myanmar is far from being complete with only limited specimens to be found in the world's herbaria. However, many un-explored regions lacking extensive inventories still remain in Myanmar. To help improve this situation, the National Museum of Nature and Science (Japan) and Forest Department, Ministry of Natural Resources and Environmental Conservation (Myanmar), have newly started an inventory project to provide contributions to the Flora and Fauna of Myanmar since 2016.

In Myanmar, Tanintharyi Region has especially not been studied flora and fauna for a long time. Actually quite a lot of species were described from there by the British botanists in the colonial time. However most of them were collected only at once at the first discovery nearly one hundred years ago. Therefore the peninsular Myanmar is one of our target regions for this project. However, the appropriate study site depends on the taxon, for example, wetland and lake or pond suitable for aquatic plants and algae, high elevation places for fungi and bryophytes etc. Plant inventories would be very important for the materials to the revised flora of Myanmar in the future.

2. Objectives

The principal purpose of the present inventory research program is to clarify the species diversity of plants, fungi, lichen for updating the flora of Myanmar and carrying out the fundamental taxonomic research for their future conservation more based on scientific evidence. At the same time we would like to clarify the relationship of Myanmar and Japanese flora.

3. Materials and Methods

3.1. Study Sites

Myanmar is geographically situated in the mainland South East Asia, with a land area of 676,577 km^2, and a coastline of 2,832 km. It lies between latitudes 9° 32' N to 28° 31'N and longitudes 92° 10' E to 101° 11'E, and is bonded by the China in the north-east, Laos and Thailand in the east, Bangladesh and India in the west. In Myanmar, we were carried out botanical inventories in the Htamanthi Wildlife Sanctuary, Sgaing Region, Tanintharyi Nature Reserve, in the vicinity of Dawei (formerly Tavoy), and Lampi Island Marine National Park, Tanintharyi Region, in 2016 and 2017 (Fig. 1 & 2).

3.2. Plant Materials, Specimens Preparation and Identification

We collected a total of 3000 voucher specimens of vascular plant species. Detailed collection localities were taken by using GPS (Global Positioning System). Species records in Myanmar are consulted based on a checklist of Myanmar (Kress et al. 2003) as well as the taxonomic literature on particular groups and regional flora including the Flora of Thailand (Smitinand et al. 1970–present), Flora of China (Wu and Larsen 2000). Voucher specimens were deposited at the herbaria of Forest Research Institute (RAF), National Museum of Nature and Science, Tsukuba (TNS) and Kyoto University Museum (KYO).

4. Results and Discussion

As the results, nine taxa of monocotyledons representing four families were newly recorded from Myanmar: *Peliosanthes weberi* (L. Rodr.) N. Tanaka (Asparagaceae), *Musa markkuana* (M.Sabu, AJoe & Sreejith) Hareesh, AJoe &

M.Sabu, *Musa nagensium* Prain var. *hongii* Häkkinen (Musaceae), *Musa sikkimensis* Kurz, *Porpax elwesii* Rolf (Orchidaceae), *Alpinia intermedia* Gagnep., *Boesenbergia purpureorubra* Mood & L.M. Prince, *Globba praecox* Chokthaweep, K.J.Williams & Paisooks. (Zingiberaceae) and seven taxa of dicotyledons representing seven families resulted in the discovery of unrecorded angiosperms among the flora of Myanmar, they are *Mitrephora winitii* Craib., *Argyreia roseopurpurea* (Kerr) Ooststr., *Diospyros bejaudii* Lecomte, *Cladogynos orientalis* Zipp. ex span., *Callicarpa furfuracea* Ridl., *Memecylon paniculatus* Jack, and *Coelospermum truncatum* (Wall.) Baill. ex K.Schum. In each of the species, voucher specimens, the general distribution and photographs are presented.

4.1. Monocotyledonous Species Newly Recorded in Myanmar

ASPARAGACEAE

Peliosanthes weberi (L. Rodr.) N. Tanaka in Novon 14(3): 362 (2004). **Fig. 3-A.**

Specimens examined: MYANMAR: **TANINTHARYI REGION**. On the hill, near Mawtaung Pass, boader of Thailand, Mawtaung Township, N11°46'59.3", E99°38'27.5", *Tagane et al. MY289* (RAF, TNS).

Distribution: Cambodia, Laos, Myanmar, Thailand, and Vietnam.

Note: *Peliosanthes weberi* was originally described under *Neolourya* (Rodriguez, 1934). However, *Neolourya* were regarded as congeneric with *Peliosanthes* at a later date (Hutchinson, 1959). Tanaka (2004) transferred *Neolourya* to *Peliosanthes* and elucidated that no remark differences were found between *Neolourya webei*, *N. pierrei* and *N. thailandica.* Therefore *N. pierrei* and *N. thailandica* have been currently synonymized under *P. webei*. This species was recorded from Myanmar for the first time.

MUSACEAE

Musa markkuana (M.Sabu, A.Joe & Sreejith) Hareesh, A.Joe & M.Sabu in Phytotaxa 303(3): 283 (2017). **Fig. 3-B.**

M. velutina H.Wendl.& Drude subsp. *markkuana* M.Sabu, A.Joe & Sreejith

Specimens examined: MYANMAR: **KACHIN STATE.** Along the Ledo Road between Shinbwiyang and Tanain, *Murata et al. 041625* (MBK, TI).

Distribution: India and Myanmar.

Note: *Musa markkuana* was firstly described as subspecies of *Musa velutina* H.Wendl.& Drude (Sabu *et al.* 2013), however, at a later date, Hareesh *et al.* (2017) taxonomically re-evaluated its entity based on comparison of anatomical and palynological characters. Presently *M. markkuana* is accepted as a distinct species. *Musa markkuana* has been recorded in Arunachal Pradesh and Nagaland, India, and this study revealed that *M. markkuana* was distributed from E. India to northwestern Myanmar.

Musa nagensium Prain var. **hongii** Häkkinen in Novon 18(3): 336 – 339 (2008). **Fig. 1-C, D**

Specimens examined: MYANMAR: **KACHIN STATE.** 9 miles from Shinbweyan toward Pansaung, near the border of Sagaing Region. N26°47'15", E96°12'30", alt. 1,080 m. *Murata et al. 041291* (MBK, TI); along the Ledo Road, between Namyung and Shinbwiyang, 5-7 miles from Shinbwiyang toward Namyung, in border area of Sagaing Region, N26°42’32”- 45’48”, E96°11’55”- 13’01”, *Tanaka et al. 041457* (MBK, TI).

Distribution: India and Myanmar.

Note: *Musa nagensium* Prain var. *hongii* was reported only from Yingjiang District of Yunnan Province, southwestern China, and northern India, and some unauthenticated reports are also from Myitkyina District, Kachin State of Myanmar (Gogoi 2013). Var. *hongii* looked very common along the Ledo Road toward the Pansaung Pass of the Indian Border as the result of the field work. This is the first record based on the voucher specimens from Myanmar side. This plant is characterized by having leaves with prominently glaucous lower surfaces.

Musa sikkimensis Kurz in J. Agric. Soc. India, n.s., 5: 164 (1878). **Fig. 4-A, B.**

Specimens examined: MYANMAR: **SAGAIN REGION.** Along the Nam Ei Zu River, Nam Ei Zu, Htamanthi Wildlife Sanctuary, N25°29’51.16”, E95°26’01.11”, 172 m alt., *Tanaka et al. MY896* (RAF, TNS).

Distribution: India and Myanmar.

Note: *Musa sikkimensis* is known as Darjeeling banana, and characterized by having dull purple inflorescence bracts, depressed, irregularly angular seeds (Kurz, 1878). The plant collected from the Htamanthi Wildlife Sanctuary along the upper Chindwin River was identified as *M. sikkimensis*. *Musa sikkimensis* is usually growing at more than 1,000 m altitude (Noltie, 1994), however, interestingly this species was discovered in a lowland at ca. 200 m alt. in Myanmar side. The collection site is eastern foothill of Myanmar Nagaland. Further comparison of Indian *M. sikkimensis* and probably also molecular study would provide its clearer entity.

ORCHIDACEAE

Porpax elwesii Rolf in Orchid. Rev. 16: 8 (1908). **Fig. 4-C.**

Specimens examined: MYANMAR: **TANINTHARYI REGION**. Thet Kal Kwet, Yephu Township, N14°23'22.3", E98°11'16.3", *Tanaka et al. MY1731* (RAF, TNS); along the trail to the waterfall, behind of Tanintharyi Nature Reserve Project Office, Yephu Township, N14°13'2.3", E98°2'54.2", *Tanaka et al. MY1732* (RAF, TNS).

Distribution: Cambodia, India, Laos, Malay Peninsula, Myanmar, Nepal, Thailand, and Vietnam.

Note: Due to lack of the specimen accumulation, Myanmar is a distribution hole for *P. elwesii* between Himalaya and other Indochinese Regions. This specimen will bridge this distributional disjunction of the species. In both localities cited above this species are growing on rocks along the streams. Rocks are quite dry at anthesis but probably will be sunk into stream water during rainy season.

ZINIGIBERACEAE

Alpinia intermedia Gagnep. in Bull. Soc. Bot. France 48: 83 (1902). **Fig. 5-A.**

Specimens examined: MYANMAR: **SHAN STATE**. Kengtung, *Mu Mu Aung 37* (TNS).

Distribution: China, Japan, Myanmar, the Philippines, Taiwan, and Thailand.

Note: *Alpinia intermedia* is thus far known from eastern Asia to the Philippines and westward to Thailand. Japan is the eastern limit of the distribution for this

species and Thailand was the western limit (e-Monocot, 2017). *Alpinia intermedia* was collected in Shan State, eastern Myanmar. This is the first record of this species from Myanmar and is considered to be the western most limit of the distribution.

Boesenbergia purpureorubra Mood & L.M. Prince in Gard. Bull. Singapore 66(2): 207–214 (2014). **Fig. 5-B.**

Specimens examined: MYANMAR: **TANINTHARYI REGION**. Bo Cho Island, Kawthaung Township, Lampi Marine National Park, N 10°40'37.8", E 98° 15' 4.7", *Tanaka et al. MY2032* (RAF, TNS).

Distribution: Myanmar (Mergui Archipelago) and Peninsular Thailand.

Note: *Boesenbergia purpureorubra* was described from Peninsular Thailand (Mood et al. 2014). As reported by Mood et al. (2014), flowers open in the morning and close early the following day, and it was observed also in Myanmar. This time we found *B. purpureorubra* from the Lampi Island Marine National Park, and it could be distributed also in peninsular part of Myanmar.

Globba praecox Chokthaweep, K.J.Williams & Paisooks. in Harvard Pap. Bot. 10(1): 57 (2005). **Fig. 5-C.**

Specimens examined: MYANMAR: **TANINTHARYI REGION**. Reserved forest of Awwyatha Temple, Palaw Township, N12 56'28.83", E98 39'13.47", alt. 101 m, *Tanaka et al. MY204* (RAF, TNS).

Distribution: Myanmar and Thailand.

Note: *Globba praecox* has unique characteristics among the genus. It was described from Kanchanaburi, Thailand, and thus far considered to be endemic. This is the first record of this species from Myanmar. This collection site is the peninsular part of Myanmar very close to the Thai border.

Zingiber thorelii Gagnep. in Bull. Soc. Bot. France 54: 169 (1907). **Fig. 5-D.**

Specimens examined: MYANMAR: **KAYAH STATE**: Kyat Gu Reserved Forest, Chikae, Loikaw Township, 925 m alt., *Mu Mu Aung et al. 84* (TNS); Kholeso reserved forest, Fruso Township, 1,167 m alt., *Mu Mu Aung et al. 99* (TNS). **TANINTHARYI REGION**. Tanintharyi Nature Reserve, *Tanaka et al. MY2695* (RAF, TNS).

Distribution: China (south), Laos, Myanmar, Thailand.

Note: *Zingiber thorelii* is quite common species in Myanmar, not only in the peninsular region. We have been collected several specimens of *Z. thorelii* mainly from southern Myanmar as cited above. Their young inflorescences are locally eaten as vegetable, and people eat them with Myanmar traditional curry.

4.2. Dicocotyledonous Species Newly Recorded in Myanmar

Annonaceae

Mitrephora winitii Craib in Bull. Misc. Inform. Kew 1922(8): 227 (1922). – – Fig 6.

This beautiful large-flowered *Miterphora* was previously known to endemic to SE (Chon Buri Province) and SW (Prachuap Khiri Khan Province) Thailand (Weerasooriya & Saunders 2010). A small population was found on dry semi-deciduous forest on hill, in Myanmar side near the Thai border.

Voucher specimen: Tanintharyi Region. On the hill, near Mawtaung Pass, border with Thailand, Mawtaung Township, 11°46'59.3"N, 99°38'27.5"E, alt. 350 m, 5 June 2017, *Naiki et al. MY288* [fl.] (KYO, RAF, TNS).

Distribution: Myanmar, Thailand (Southeast and Southwest).

Convolvulaceae

Argyreia roseopurpurea (Kerr) Ooststr. in Blumea 7: 178 (1952).

A fruiting plant was collected from edge of slightly disturbed primary evergreen forest.

Voucher specimen: Tanintharyi Region. Along the roadside, near the border of Boping Township, ca. 20 km N of Manoron; in almost primary evergreen forest, alt. 218 m, 11°43'30.47"N, 99°05'32.36"E, alt. 218 m, 7 June 2016, *Tagane et al. MY401* [fr.] (KYO, RAF, TNS).

Distribution: Malaysia (Peninsular), Myanmar, Thailand (Southwest, Peninsular).

Ebenaceae

Diospyros bejaudii Lecomte in Bull. Mus. Natl. Hist. Nat. 1929, Ser. 2(1): 430 (1929).

This species is known to occur usually near or on limestone hills (Phengklai 1981) and our collection site exactly so.

Voucher specimen: Tanintharyi Region. On the hill, near Mawtaung Pass, border with Thailand, Mawtaung Township, 11°46'59.3"N, 99°38'27.5"E, alt. 350 m, 5 June 2017, *Tagane et al. MY293* (KYO, RAF, TNS).

Distribution: Cambodia, Malaysia (Peninsular), Myanmar, Thailand.

Euphorbiaceae

Cladogynos orientalis Zipp. ex Span. in Linnaea 15: 349 (1841).

Cladogynos Zipp,. ex Span. is a monotypic genus widely distributed in SE Asia (Chayamarit & van Welzen 2005). It is easily recognized by shrubby habit and densely white pubescent and floccose lower surface of lamina. The specimen was collected from dry semi-deciduous forest near Thai border.

Voucher specimen: Tanintharyi Region. On the hill, near Mawtaung Pass, border with Thailand, Mawtaung Township, 11°46'59.3"N, 99°38'27.5"E, alt. 350 m, 5 June 2017, *Tanaka et al. MY291* [fr.]. (KYO, RAF, TNS).

Distribution: Cambodia, China (Guangxi), Indonesia (Java), Laos, Myanmar, Philippines, Thailand, Vietnam.

Lamiaceae

Callicarpa furfuracea Ridl. in J. Fed. Malay States Mus. 10: 150 (1920).

We encountered this species along the edge of primary lowland evergreen forest. The species is easily recognized by scandent shrubby habit (or woody climber) to 3 m tall, broadly elliptic, ovate or obovate leaves and an interpetiolar woody ridge at the stem of nodes (Leeatiwong et al. 2009).

Voucher specimen: Tanintharyi Region. Along the roadside en route from Mawtaung to Tanintharyi, SE of Tanintharyi Town; the place close to primary evergreen forest, 11°52'06.73"N, 99°17'38.46"E, alt. 73 m, 6 June 2016, *Tagane et al. MY364* (KYO, RAF, TNS).

Distribution: Malaysia (Peninsular), Myanmar, Thailand (Peninsular).

Melastomataceae

Memecylon paniculatum Jack, Malayan Misc. 2(7): 62 (1822).

This species is easily distinct from the other species of *Memecylon* by characteristic 4-winged young twigs, relatively larger leaves (10.5–21.2 x 4.1–7.4 cm), cordate base of lamina and prominent lateral veins on lower surface. We found this species at the edge of evergreen forest on Pataw Island, located at the mouth of Tanintharyi River.

Voucher specimen: Tanintharyi Region. Near the Pagoda on the top of the hill, Pataw Island, Tanintharyi, Kyunsu Township, Myeik District., 12°27'20.70"N, 98°34'35.80"E, alt. 246 m, 8 June 2016, *Tagane et al. MY462* (RAF, TNS).

Distribution: Cambodia, Indonesia (Java, Kalimantan, Sumatra, Sulawesi), Malaysia (Borneo, Peninsular), Philippines, Singapore, Thailand (Peninsular).

Rubiaceae

Coelospermum truncatum (Wall.) Baill. ex K.Schum., in Engler & Prantl, Nat. Pflanzenfam. 4: 136 (1891).

The genus *Coelospermum* Blume is a small genus consisting of seven species. Among them, only *C. truncatum* has wide distribution range in the Indo-Chinese and Malesian Regions, with the exception of Philippines, whereas the others are mostly restricted to the regions (Johansson 1988). In Myanmar, we found this liana at the edge of evergreen forest on Pataw Island, appearing the northern limit of Andaman Sea side.

Voucher specimen: Tanintharyi Region: near the Pagoda on the top of the hill, Pataw Island, Tanintharyi, Kyunsu Township, Myeik District., 12°27'17.11"N, 98°34'33.27"E, alt. 51 m, 8 June 2016, *Tanaka et al. MY495* [fr.] (KYO, RAF, TNS).

Distribution: Cambodia, China (Hainan), Indonesia, Malaysia, Thailand, Vietnam.

5. Conclusion

Many new records of the plants are still to be expected from Myanmar. To develop the better conservation planning, it is necessary to conduct further intensive botanical inventories and accurately know the plant species diversity as

reliable baseline information. Further continuous field works will provide the good materials towards the Flora of Myanmar. Publications: these results are presenting by a series paper such as ***"Contributions towards the Flora of Myanmar"***, and other appropriate papers. ***"Specimen Database for Flora of Myanmar"*** is now creating by this project.

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References

Chayamarit, K. & van Welzen, P. C. 2005. *Cladogynos*. In: Chayamarit, K. & van Welzen P. C. (Eds) Flora of Thailand 8(2), pp. 158–159.

eMonocot. 2017. eMonocot: An online resource for monocot plants, version 1.0.2.

Available from: http//emonocot.org/ (accessed 11 October 2017).

Gardner, S, Sidisunthorn P. & Chayamarit, K. 2015. Forest trees of Southern Thailand 1, 749 pp. The Forest Herbarium, Bangkok and The Royal Botanic Garden Kew.

Gogoi, R. 2013. *Musa nagensium* var. *hongii* Häkkinen—a New Addition to the Flora of India. Taiwania 58(1): 49 – 52.

Govaerts, R. 1995. World Checklist of Seed Plants 1(1, 2): 1–483, 1–529.

Hareesh, V. S., Joe, A., Sreejith, P. E. & Sabu, M. 2017. *Musa markkuana* stat. nov.

(Musaceae)–A reassessment of *Musa velutina* subsp. *markkuana.* Phytotaxa 303 (3): 279–284.

Hutchinson, J. 1959. Peliosanthes. In Families of Flowering Plants, Vol. 2. Monocotyledons, 2nd ed. Oxford University Press, London.

Johansson, J.T. 1988. Revision of the genus *Caelospermum* Blume (Rubiaceae, Rubioideae, Morindeae). Blumea 33: 265–297.

Kress, J., DeFilipps, R.A., Farr, E. & Yin Yin Kyi. 2003. A checklist of the trees, shrubs, herbs, and climbers of Myanmar. Smithsonian Institution, Contributions from the United States National Herbarium volume 45, pp.1–590.

Kurz, W. 1878. The Banana: a Pomological contribution. Journal of Agricultural and Horticultural Society of India 5: 112–168.

Kurzweil, H. 2013. *Calanthe punctata* (Orchidaceae), a new species from southern Myanmar. Gardens' Bulletin Singapore 65(2): 163–168. 2013

Kurzweil, H. & Lwin, S. 2015. New orchid records for Myanmar, including the first record of the genus *Stereosandra*. Gardens' Bulletin Singapore 67(1): 107–122.

Leeratiwong, C., Chantaranothai, P. and Paton, A.J. 2009. A synopsis of the genus *Callicarpa* L. (Lamiaceae) in Thailand. Thai Forest Bulletin (Botany) 37: 36–58.

Mood, J., Veldkamp, J.F. and Prince, L.M. 2014. A new species and a new record of *Boesenbergia* (Zingiberaceae) for Thailand. Gard. Bull. Singapore 66(2): 207–214.

Noltie, HJ. 1994. Musaceae. In Flora of Bhutan. Volume 3, Part 1, pp. 177-181. Royal Botanic Garden Edinburgh, Edinburgh.

Phengklai C. 1981. Ebenaceae. In: Smitinand, T. & Larsen, K. (Eds.) Thai Forest Bulletin (Botany) 2, pp 281–392.

Ruchisansakun S, Suksathan P, van der Niet T, Saw-Lwin & Janssens S.B. 2017. *Impatiens tanintharyiensis* (Balsaminaceae), a new species from Southern Myanmar. Phytotaxa 296(2): 171–179.

Rodriguez, L. 1934. Hemodoracees. Nouvelles d'Indochine. Bull. Mus. Hist. Nat. (Paris), Ser. II, 6: 95–97.

Sabu, M. Joe, A. & Sreejith, P. E. 2013. *Musa velutina* subsp. *markkuana* (Musaceae): a new subspecies from northern India. Phytotaxa 92 (2): 49–54.

Smitinand, T. & Larsen K. et al. (eds.) (1970–present) Flora of Thailand. Bangkok: The Forest Herbarium, Department of National Parks, Wildlife and Plant Conservation.

Tanaka, N. 2004. Inclusion of *Neolourya* in *Peliosanthes* (Convallariaceae). Nord. Jour. Bot. 14(3): 360–364.

Tanaka, N. 2005. Plant inventory research: Contributions to the flora of Myanmar. Acta Phytotaxonomica et Geobotanica Botanica 56: 21–26.

Tanaka, N. 2010. Plant Inventory Research in Myanmar. Bunrui 10(2): 139–149. (in Japanese).

Wu, T.L. and Larsen, K. 2000. Zingiberaceae. In: Wu, Z.-Y. and P.H. Raven (eds), Flora of China vol. 24, pp. 333-346, Science Press, Beijing and Missouri Botanical Garden Press, St. Louis.

Figures

Study Area in 2016

- **Kachin State: Indawgyi Lake NP**
- **Mandalay: Pyin Oo Lwin**
- **Sagain: Htamanthyi WS**
- **Tanintharyi: Tanintharyi Nature Reserve, Myeik, Tanintharyi, Lenya, etc.**

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Study Sites 2017

- **Bago**: Oktwin Township
- **Kayah**: Loikaw and Mothito Nature Reserve
- **Mon**: Mawlamiyaing
- **Tanintharyi**: Lampi Island Marine National Park

Fig. 3. A. *Peliosanthes weberi* (L. Rodr.) N. Tanaka (Asparagaceae). B. *Musa markkuana* (M.Sabu, AJoe & Sreejith) Hareesh, AJoe & M.Sabu. C, D. *Musa nagensium* Prain var. *hongii* Häkkinen (Musaceae).

Fig. 4. A&B. *Musa sikkimensis* Kurz., C. *Porpax elwesii* Rolf (Orchidaceae)

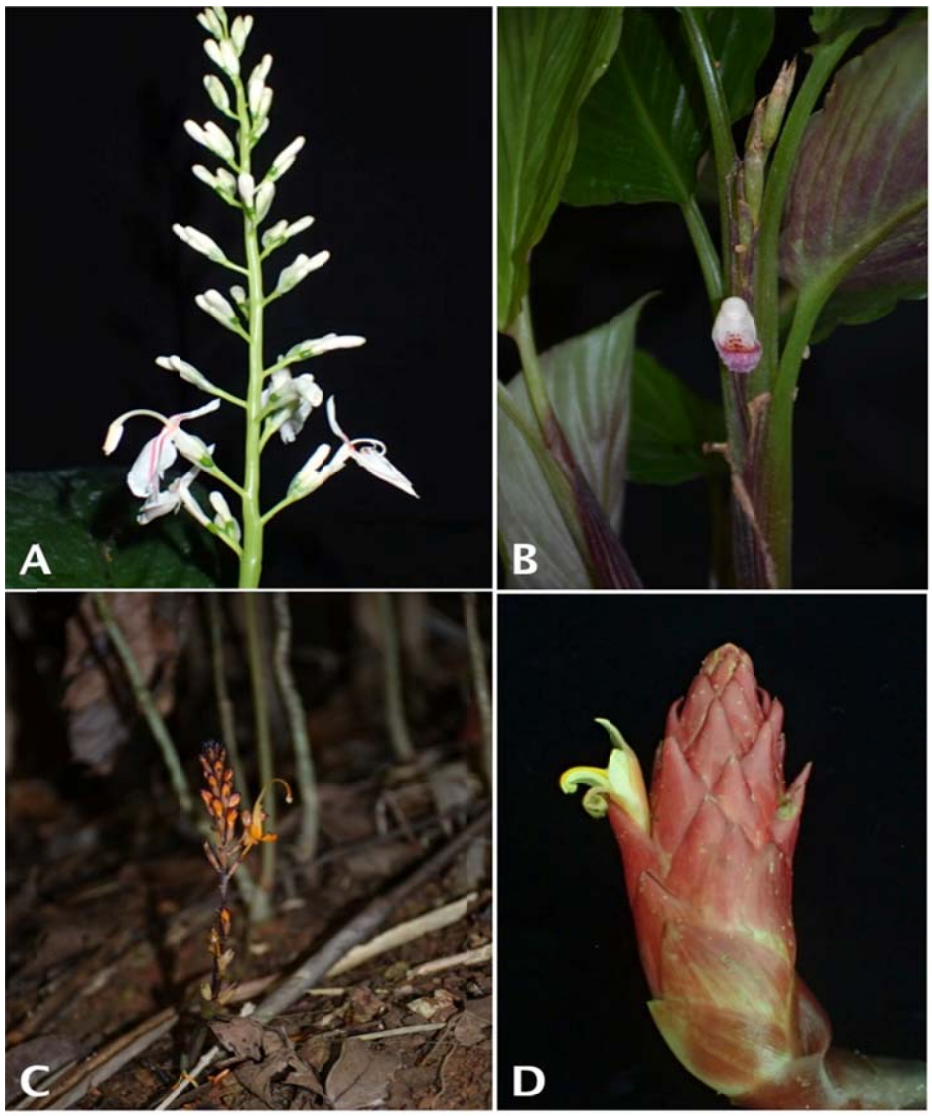

Fig. 5. A. *Alpinia intermedia* Gagnep. B. *Boesenbergia purpureorubra* Mood & L.M. Prince (Zingiberaceae). C. *Globba praecox* Chokthaweep, K.J.Williams & Paisooks. (Zingiberaceae). D. *Zingiber thorelii* Gagnep. (Zingiberaceae).

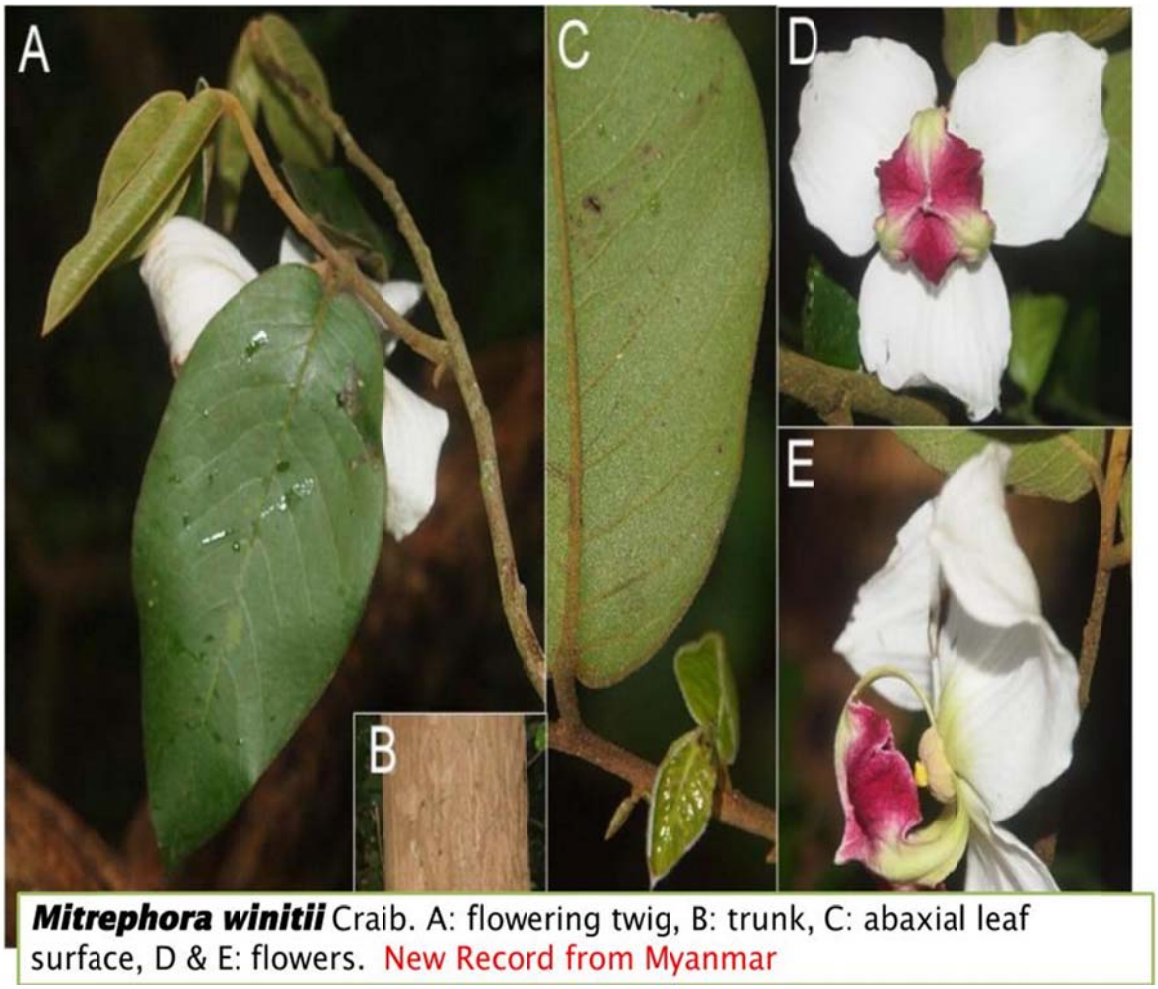

Fig. 6. *Mitrephora winitii* Craib. A: flowering twig, B: trunk, C: abaxial leaf surface, D & E: flowers.