

The Republic of the Union of Myanmar
Ministry of Natural Resources and Environmental Conservation
Forest Department



**Preliminary updating the Checklist of Native Tree Species in
Myanmar based on the herbarium specimens**



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Contents

စာတမ်းအကျဉ်း	i
Abstract	iii
1. Introduction	1
1.1 Tree Flora of Myanmar	1
1.2 Tree Species Conservation in Myanmar	1
2. Objectives	2
3. Materials and Methods	2
3.1 Study Area	2
3.2 Herbarium specimen examination	2
3.3 Dataset Preparation for taxonomic name standardization	2
3.4 Taxonomic Name Standardization	3
3.5 Updating the Checklist of Myanmar tree flora	3
4. Results	3
Native Tree Species Richness in Myanmar	3
5. Discussion	12
6. Conclusion	12
Acknowledgements	
References	
Appendix 1	

**ပန်းပုံစံနမူနာများအပေါ် အခြေခံ၍ မြန်မာ့ဒေသရင်း သစ်မျိုးစိတ်စာရင်းအား
ပဏာမအနေဖြင့် ခေတ်နှင့်အညီ အသစ်ပြုပြင် မွမ်းမံခြင်း**

ဦးရဲလွင်အောင်၊ ဦးစီးအရာရှိ

ဒေါ်ဖြူဖြူနှင်း၊ လက်ထောက်သုတေသနအရာရှိ

ဦးချမ်းငြိမ်းကိုကို၊ သုတေသနလက်ထောက်-၃

ဦးအောင်ဇော်မိုး၊ သုတေသနအရာရှိ

စာတမ်းအကျဉ်း

မြန်မာနိုင်ငံသည် ဇီဝမျိုးစုံမျိုးကွဲနှင့် ယဉ်ကျေးမှုလေ့များကြွယ်ဝသည့် အရှေ့တောင်အာရှ ပင်မကုန်းမြေဒေသတွင် တည်ရှိပါသည်။ ထို့အပြင် မြန်မာနိုင်ငံသည် ထူးခြားသည့် ဇီဝမျိုးစုံမျိုးကွဲ ကြွယ်ဝခြင်းနှင့် အဆိုပါဇီဝမျိုးစုံမျိုးကွဲများအား ဆောလျင်စွာ ထိန်းသိမ်းဖို့ လိုအပ်ခြင်းတို့ကြောင့် အင်ဒိုဗားမား ဇီဝမျိုးစုံမျိုးကွဲ ထူးခြားရပ်ဝန်းဒေသကြီးအတွင်းတွင်လည်း ပါဝင်လျက်ရှိပါသည်။ သဘာဝသစ်တောများသည် ဇီဝသက်ရှိအမျိုးမျိုးအတွက် မှီတည်ရာ ဌာနေရပ်ဝန်းဖြစ်ပါ သည်။ ထို့ကြောင့် သစ်တောသစ်ပင်များသည် သစ်တောဂေဟစနစ်အတွက် အရေးပါသည့် အခြေခံ အစိတ်အပိုင်းအဖြစ်လည်းကောင်း၊ ကမ္ဘာတစ်ဝန်း ဂေဟစနစ် ထိန်းညှိရေးအတွက် အရေးပါသည့် အခန်းကဏ္ဍမှပါဝင်၍လည်းကောင်း အထူးအရေးပါလှပါသည်။ အထူးသဖြင့် သစ်တောသစ်ပင်များသည် သစ်ကပ်အပင်များနှင့် သစ်ပင်ပေါ်တွင်နေထိုင်သည့် သတ္တဝါများ အတွက် နေအိမ်သဖွယ် အရေးပါလှပါသည်။ ထို့အပြင် သစ်တောသစ်ပင်များသည် စီးပွားရေး အရ များစွာအရေးပါလှပြီး ပြည်တွင်း/ပြည်ပသစ်ဈေးကွက်အတွက် သစ်ထုတ်လုပ်ရောင်းချ နိုင်ခြင်းဖြင့်လည်းကောင်း၊ ဒေသခံပြည်သူများအတွက် ထင်းလောင်စာ ပံ့ပိုးပေးနိုင်ခြင်းဖြင့် လည်းကောင်း အထူးအရေးပါလှပါသည်။ ထို့သို့သောအရေးပါသည့် အခြေခံအကြောင်းအရာများ ကြောင့် ဇီဝမျိုးစုံမျိုးကွဲထိန်းသိမ်းရေးအတွက် သော်လည်းကောင်း၊ သစ်ထုတ်လုပ်ရောင်းချ နိုင်ရေးအတွက်သော်လည်းကောင်း ဒေသရပ်ဝန်းတစ်ခုအတွင်း သို့မဟုတ် နိုင်ငံတစ်ခုအတွင်း ပေါက်ရောက်သည့် သစ်မျိုးစိတ်အရေအတွက်အား သိရှိရန်လိုအပ်လာပါသည်။ မြန်မာနိုင်ငံ တွင် သစ်မျိုးစိတ်အရေအတွက်အား လွန်ခဲ့သည့် ဆယ်စုနှစ်များစွာကပင် အစဉ်အဆက် ရေတွက်မှတ်တမ်းတင်လာခဲ့ပါသည်။ သို့သော် ယခုအခါတွင် သိပ္ပံပညာရပ်ဆိုင်ရာ တိုးတက် လာမှုများကြောင့် မျိုးစိတ်ခွဲခြားခြင်းဆိုင်ရာ အပြောင်းအလဲများ ဖြစ်ပေါ်လာလျက်ရှိပြီး မျက်မှောက်ခေတ် ထိန်းသိမ်းကာကွယ်ရေးအစီအစဉ်များအား ဆောင်ရွက်ရန် လိုအပ်လာခြင်း တို့ကြောင့် မြန်မာ့သစ်မျိုးစိတ်စာရင်းအား အသစ်ပြုပြင်မွမ်းမံခြင်းအား ပဏာမအနေဖြင့် ဆောင်ရွက်ခဲ့ပါသည်။ မြန်မာ့သစ်မျိုးစိတ်စာရင်းအား ပန်းပုံစံနမူနာများ၊ စာပေအထောက် အထားများနှင့် အွန်လိုင်းဒေတာဘေ့ခ်များအပေါ် အဓိကမူတည်၍ အသစ်ပြုပြင်မွမ်းမံခဲ့ပါသည်။

အပင်မျိုးစိတ် အမည်နာမ စံသတ်မှတ်ခြင်းအား R software တွင် WorldFlora R package အသုံးပြု၍ ဆောင်ရွက်ခဲ့ပါသည်။ ရလဒ်အနေဖြင့် မြန်မာ့သစ်မျိုးစိတ် မျိုးရင်း(၈၅)ခုတွင် မျိုးစု (၅၁၀)ခု နှင့် မျိုးစိတ်(၁,၈၉၁)မျိုးအား လေ့လာမှတ်တမ်းတင်နိုင်ခဲ့ပါသည်။ သို့သော် မြန်မာ့သစ်မျိုးစိတ် ကြွယ်ဝခြင်းအား ထပ်မံလေ့လာဖို့ လိုအပ်ပါသေးသည်။ မည့်သို့ပင်ဆိုစေကာမူ ယခုလက်ရှိ သစ်မျိုးစိတ်စာရင်းသည် မြန်မာနိုင်ငံတွင် သစ်တောသယံဇာတ စီမံအုပ်ချုပ်ထိန်းသိမ်းရေး လုပ်ငန်းစဉ်အတွက် အခြေခံအချက်အလက်အဖြစ် များစွာအသုံးဝင်မည်ဖြစ်ပါသည်။

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Abstract

Myanmar is situated in Southeast Asia mainland with high richness of biodiversity and cultural diversity and also included in the Indo-Burma biodiversity hotspot due to its unique biodiversity richness and its urgency for biodiversity conservation. Forests are home to various organisms in a given ecosystem. In this regard, trees are the building blocks for forest ecosystems and serve as the various functions for ecosystem regulations across the globe. In particular, trees are home to various epiphytes and tree-dwelling animals. In addition, trees are of economic importance, especially timber production for global and local timber market and fuel wood supply to rural communities. Therefore, the basic question on trees is how many tree species occurred in a given region or country for biodiversity conservation and timber production. In Myanmar, the number of tree species have been enumerated and documented over the period of past decades. But the taxonomic name changes have occurred due to scientific advances and conservation assessments also become important for present day conservation awareness and actions. Therefore, the preliminary attempts were made to deal with such challenges. In the present study, the checklist of Myanmar tree flora was updated mainly based on the herbarium specimens, all relevant literature and online databases. The taxonomic name standardization was conducted by using WorldFlora R package in R statistical environment. As a result, the present study can provide a checklist of 1,891 species in 510 genera of 85 families of Myanmar tree flora. However, further studies are still needed to better understand the tree flora of Myanmar. Anyhow, the present checklist will serve as the baseline data for forest resource management and conservation in Myanmar.

Key Words: checklist, herbarium specimens, Myanmar, tree flora, forest conservation

Preliminary updating the Checklist of Native Tree Species in Myanmar based on the herbarium specimens

1. Introduction

1.1 Tree Flora of Myanmar

Myanmar is one of the Southeast Asian countries, with high richness of natural resources. As for floristic realm, Myanmar is mainly included in the Indo-Malesian floristic realm (Liu et al. 2023). In addition, Myanmar is one of the countries which are included in the Indo-Burma biodiversity hotspot, with high species richness and endemism (Myers et al. 2000, Mittermeier et al. 2011). Due to its broad latitudinal range (tropical to subtropical), topographical (mostly mountainous) and climatic (monsoonal) factors, there are various types of ecosystems in Myanmar, from southern tropical evergreen rainforest ecosystem to northern subtropical montane forest ecosystem through central dry deciduous forests.

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Myanmar tree biodiversity is very rich but still needs to be explored more and more in order to better understand the species richness and distribution patterns. In Myanmar, the number of tree species have been enumerated and documented over the period of past decades. According to the Checklist of Plants of Myanmar (Kress et al. 2003), there are about 2,000 tree species in Myanmar, some of which need special conservation attention and actions (FAO 1999).

However, the taxonomic name changes have occurred due to scientific advances in plant taxonomy and systematics in the recent years, resulting in the newly updated classification systems in both angiosperms and gymnosperms. In addition, biodiversity conservation assessments also become important for present day conservation awareness and actions. In this regard, the taxonomic attempts at updating the checklist of native tree species in Myanmar are needed to deal with such challenges. Therefore, the present study will be the preliminary attempts at updating the checklist of Myanmar tree flora mainly based on the herbarium specimens, all relevant literature and online databases.

1.2 Tree Species Conservation in Myanmar

Tree species conservation is under the theme of biodiversity conservation program in Myanmar. Some locally or globally endangered plant species including tree species are legally protected by national legislation across the country. The major threat to tree species survival is the habitat loss due to deforestation and land use change in Myanmar. Although there are various challenges for effective conservation of biodiversity in Myanmar, the conservation efforts are still being made across the country. In Myanmar, the major approach of biodiversity conservation is the establishment of Protected Area System (PAS) across the country, currently having established 59 protected areas (6.44 % of country's total area).

In this regard, the present study is conducted to investigate the tree species richness in Myanmar. The present study will bridge the gap of knowledge on tree flora of Myanmar and it will highlight the conservation awareness for tree conservation in Myanmar.

2. Objectives

The main objectives of the present study are as follows;

- To update the checklist of native tree species in Myanmar which will serve as baseline data for biodiversity conservation,
- To study the species richness and conservation status of native tree species in Myanmar,
- To contribute the plant diversity and distribution data to the biodiversity conservation program of Myanmar.

3. Materials and Methods

3.1 Study Area

The study area is Myanmar which is situated in the mainland Southeast Asia and also included in the Indo-Malesian floristic realm (**Fig 1**) (Liu et al. 2023). Myanmar is also home to diverse species of fauna and flora. As for biodiversity richness, Myanmar is also included in the Indo-Burma biodiversity hotspot area.

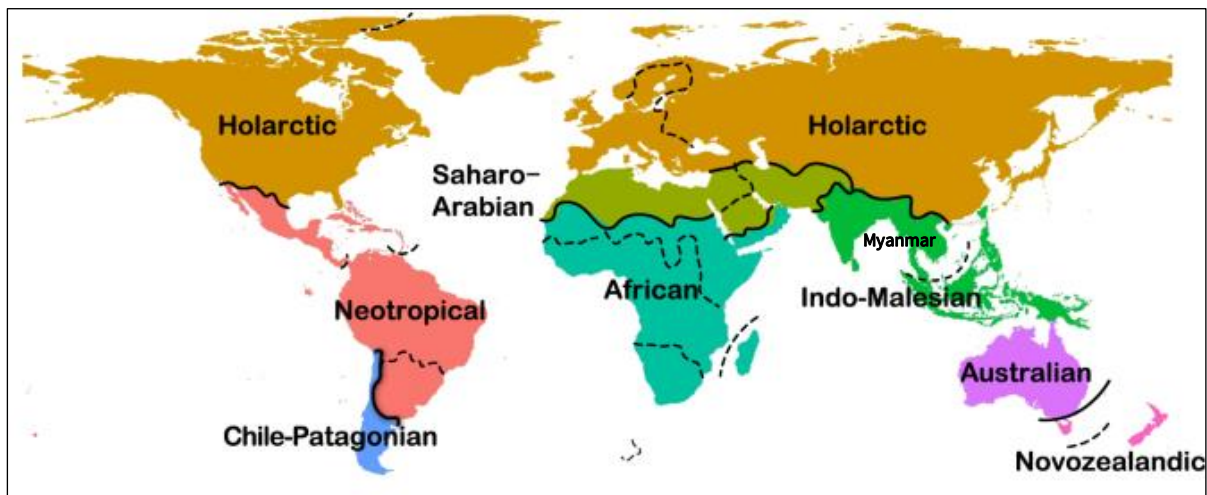


Fig 1. Floristic realms of the world, showing that Myanmar is included in Indo-Malesian floristic realm (Liu et al. 2023, <https://doi.org/10.1038/s41467-023-38375-y>)

3.2 Herbarium specimen examination

Examination of herbarium specimens was conducted at the herbarium (RAF) of Forest Research Institute in Yezin, Nay Pyi Taw. The herbarium specimens were examined, including specimens deposited at herbarium (RAF) and specimen records (both datasets and specimen photographs) downloaded from Chinese Virtual Herbarium and online herbaria: AMES, BM, E, GH, K, L, NY, P, US and W (Thiers 2024, <http://sweetgum.nybg.org/ih/>).

3.3 Dataset Preparation for taxonomic name standardization

In order to conduct taxonomic name standardization of Myanmar tree flora by using WorldFlora R package (Kindt 2020), the dataset was developed mainly based on the Checklist of Plants of Myanmar (Kress et al. 2003) and then the dataset was revised and verified based on the herbarium specimens, tree dataset from Global Tree Portal and species occurrence dataset from Global Biodiversity Information Facility (GBIF 2023, BGCI 2024).

3.4 Taxonomic Name Standardization

The taxonomic name standardization on the dataset of Myanmar tree flora was conducted by using WorldFlora R package (Kindt 2020) in R (R Core Team 2022). In addition, the resulting taxonomic names were also verified in consultation with the online databases such as IPNI (<https://www.ipni.org/>), POWO (<https://powo.science.kew.org/>), WFO (<https://www.worldfloraonline.org/>) and so on (IPNI 2023, POWO 2023, WFO 2024).

3.5 Updating the Checklist of Myanmar tree flora

In the present study, the checklist of native tree species in Myanmar was revised and updated mainly based on the Myanmar tree species dataset resulted from taxonomic name standardization by using WorldFlora R package (Kindt 2020) in R (R Core Team 2022). We followed the classification system of APG IV (Angiosperm Phylogeny Group 2016) and all relevant literature (Christenhusz et al. 2011).

4. Results

Native Tree Species Richness in Myanmar

In the present study, the checklist of Myanmar tree flora was revised and updated mainly based on the herbarium specimens, all relevant literature and reliable online databases. Some species or taxa are currently set aside if they need to be re-examined later due to lack of voucher specimen citations or lack of taxonomic or occurrence evidences even though they were listed in the checklist of Kress et al. 2003 and Global Tree Portal. These species or taxa are still under taxonomic review to make their taxonomic statuses confirmed.

As a result, there are 1,891 species in 510 genera of 85 families currently known from Myanmar. The updated checklist consists of all native tree species of Myanmar which are taxonomically accepted and currently known from Myanmar, mainly based on the checklists of Kress et al. 2003 and all relevant papers. The number of species in each family of Myanmar tree flora is shown in **Table 1**. The number of species in each genus of Myanmar tree flora is shown in **Table 2**. The updated checklist of Myanmar tree flora can be seen in detail in **Appendix 1**.

In terms of endemism, there are ca. 170 species endemic to Myanmar, representing ca. 9% of total native tree species in Myanmar (**Fig 2**). According to the IUCN Red List database and Global Tree Portal database, many tree species of Myanmar are still lacking their respective conservation assessments and some have been already included in threatened categories (**Fig 3**). Therefore, proper conservation assessments are still needed for all tree species native to Myanmar (IUCN 2001, 2012, IUCN Standards and Petitions Committee 2022).

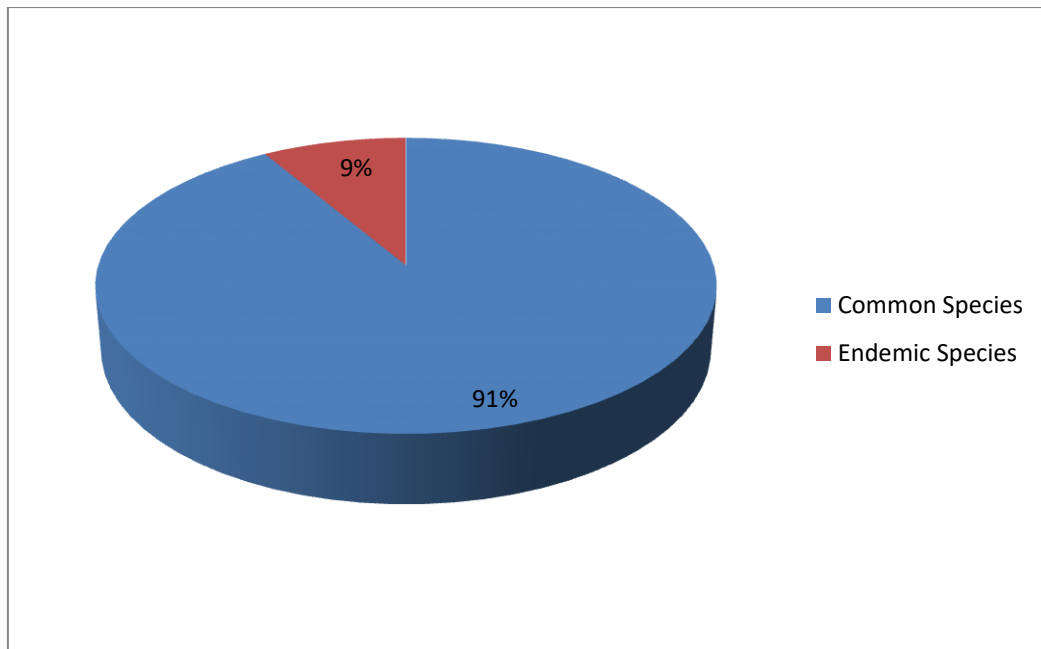


Fig 2. The endemism of Myanmar Tree Flora

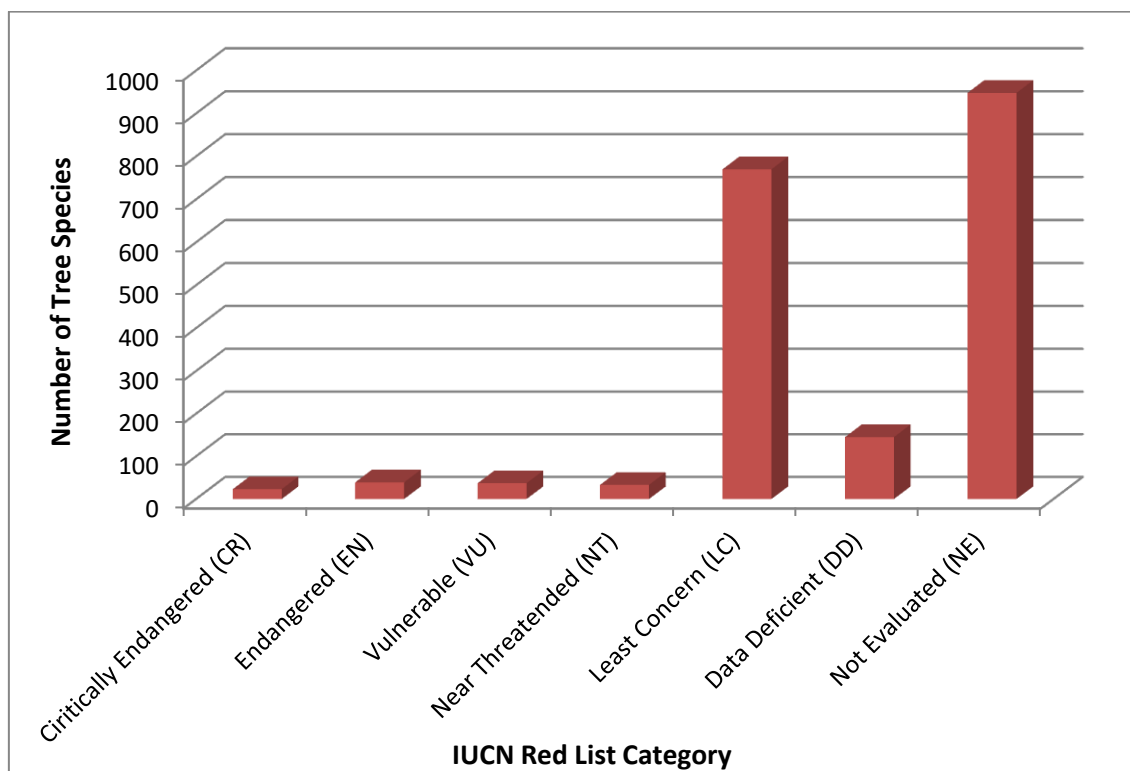


Fig 3. IUCN Red List Conservation Status of Native Tree Species in Myanmar
(Source: IUCN Red List Database and Global Tree Portal)

Table 1. List of Families which consist of native tree species in Myanmar

No.	Family	Number of Species
1	Acanthaceae	2
2	Achariaceae	8
3	Actinidiaceae	6
4	Altingiaceae	1
5	Anacardiaceae	58
6	Aneuraceae	1
7	Annonaceae	51
8	Apocynaceae	12
9	Aquifoliaceae	17
10	Araliaceae	33
11	Arecaceae	27
12	Asteraceae	5
13	Berberidaceae	1
14	Betulaceae	7
15	Bignoniaceae	20
16	Boraginaceae	18
17	Burseraceae	9
18	Calophyllaceae	11
19	Campanulaceae	2
20	Cannabaceae	11
21	Capparaceae	7
22	Cardiopteridaceae	1
23	Celastraceae	33
24	Centroplacaceae	2
25	Clusiaceae	17
26	Combretaceae	21
27	Connaraceae	4
28	Cornaceae	4
29	Cupressaceae	6
30	Daphniphyllaceae	3
31	Dichapetalaceae	4
32	Dilleniaceae	7
33	Dipterocarpaceae	49
34	Ebenaceae	38
35	Elaeocarpaceae	28
36	Ericaceae	26
37	Euphorbiaceae	59
38	Fabaceae	148
39	Fagaceae	76
40	Hamamelidaceae	4
41	Hypericaceae	4
42	Icacinales	2
43	Lamiaceae	34
44	Lauraceae	135
45	Lecythidaceae	12

No.	Family	Number of Species
46	Lythraceae	13
47	Magnoliaceae	18
48	Malvaceae	83
49	Meliaceae	46
50	Metteniusaceae	1
51	Moraceae	71
52	Myristicaceae	16
53	Myrtaceae	72
54	Nyssaceae	4
55	Olacaceae	1
56	Pandaceae	1
57	Pentaphylacaceae	14
58	Peraceae	1
59	Phyllanthaceae	66
60	Pinaceae	14
61	Pittosporaceae	3
62	Podocarpaceae	8
63	Polygalaceae	4
64	Primulaceae	15
65	Proteaceae	9
66	Putranjivaceae	11
67	Rhizophoraceae	12
68	Rosaceae	75
69	Rubiaceae	79
70	Rutaceae	37
71	Sabiaceae	10
72	Salicaceae	35
73	Sapindaceae	48
74	Sapotaceae	21
75	Simaroubaceae	1
76	Stemonuraceae	5
77	Styracaceae	11
78	Symplocaceae	26
79	Theaceae	18
80	Ulmaceae	2
81	Urticaceae	9
82	Verbenaceae	1
83	Viburnaceae	1
84	Violaceae	3
85	Zygophyllaceae	2
	Total	1891

Table 2. List of Genera which consist of native tree species in Myanmar

No.	Genus	Number of species
1	<i>Abies</i>	4
2	<i>Abroma</i>	1
3	<i>Acacia</i>	16
4	<i>Acalypha</i>	1
5	<i>Acer</i>	14
6	<i>Acrocarpus</i>	1
7	<i>Acronychia</i>	1
8	<i>Actinodaphne</i>	5
9	<i>Adenanthera</i>	1
10	<i>Adinandra</i>	3
11	<i>Aegiceras</i>	1
12	<i>Aegle</i>	1
13	<i>Azizia</i>	2
14	<i>Aglaia</i>	13
15	<i>Aidia</i>	3
16	<i>Albizia</i>	14
17	<i>Alchornea</i>	1
18	<i>Aleurites</i>	1
19	<i>Allophylus</i>	2
20	<i>Allospondias</i>	1
21	<i>Alnus</i>	1
22	<i>Alphonsea</i>	2
23	<i>Alseodaphne</i>	8
24	<i>Alstonia</i>	2
25	<i>Altingia</i>	1
26	<i>Amesiodendron</i>	1
27	<i>Amherstia</i>	1
28	<i>Amoora</i>	3
29	<i>Anacolosia</i>	1
30	<i>Anisoptera</i>	3
31	<i>Anneslea</i>	1
32	<i>Anogeissus</i>	2
33	<i>Antiaris</i>	1
34	<i>Antidesma</i>	10
35	<i>Aphananthe</i>	1
36	<i>Apodytes</i>	1
37	<i>Aporosa</i>	11
38	<i>Aralia</i>	4
39	<i>Archidendron</i>	6
40	<i>Ardisia</i>	2
41	<i>Areca</i>	1
42	<i>Arenga</i>	2
43	<i>Artabotrys</i>	2
44	<i>Artocarpus</i>	5
45	<i>Arytera</i>	1

No.	Genus	Number of species
46	<i>Atalantia</i>	1
47	<i>Atractocarpus</i>	1
48	<i>Avicennia</i>	2
49	<i>Azadirachta</i>	2
50	<i>Baccaurea</i>	4
51	<i>Baeckea</i>	1
52	<i>Balakata</i>	1
53	<i>Balanites</i>	2
54	<i>Balanostreblus</i>	1
55	<i>Baliospermum</i>	1
56	<i>Barringtonia</i>	9
57	<i>Bauhinia</i>	8
58	<i>Beilschmiedia</i>	8
59	<i>Benkara</i>	1
60	<i>Bennettiodendron</i>	1
61	<i>Berberis</i>	1
62	<i>Berrya</i>	2
63	<i>Betula</i>	3
64	<i>Bhesa</i>	2
65	<i>Bischofia</i>	1
66	<i>Blumea</i>	1
67	<i>Blumeodendron</i>	1
68	<i>Boehmeria</i>	1
69	<i>Bombax</i>	3
70	<i>Borassus</i>	1
71	<i>Botryophora</i>	1
72	<i>Brassaiopsis</i>	9
73	<i>Breynia</i>	1
74	<i>Bridelia</i>	6
75	<i>Brownlowia</i>	4
76	<i>Brucea</i>	1
77	<i>Bruguiera</i>	5
78	<i>Buchanania</i>	6
79	<i>Burretiodendron</i>	1
80	<i>Butea</i>	1
81	<i>Caesalpinia</i>	2
82	<i>Callerya</i>	1
83	<i>Calliandra</i>	1
84	<i>Callicarpa</i>	3
85	<i>Callistemon</i>	1
86	<i>Callitris</i>	1
87	<i>Calophyllum</i>	6
88	<i>Camellia</i>	6
89	<i>Canarium</i>	7
90	<i>Canthium</i>	2

(Continued table)

No.	Genus	Number of species
91	<i>Capparis</i>	3
92	<i>Carallia</i>	1
93	<i>Careya</i>	1
94	<i>Carpinus</i>	2
95	<i>Caryota</i>	2
96	<i>Casearia</i>	8
97	<i>Cassia</i>	2
98	<i>Cassine</i>	2
99	<i>Castanea</i>	1
100	<i>Castanopsis</i>	20
101	<i>Catunaregam</i>	1
102	<i>Cedrela</i>	2
103	<i>Celtis</i>	4
104	<i>Cephalanthus</i>	2
105	<i>Cerbera</i>	1
106	<i>Ceriops</i>	2
107	<i>Ceriscoides</i>	2
108	<i>Chaenomeles</i>	1
109	<i>Chaetocarpus</i>	1
110	<i>Chisocheton</i>	3
111	<i>Choerospondias</i>	1
112	<i>Chonemorpha</i>	1
113	<i>Chrysophyllum</i>	1
114	<i>Chukrasia</i>	2
115	<i>Chydenanthus</i>	2
116	<i>Cinnamomum</i>	26
117	<i>Cipadessa</i>	1
118	<i>Citiharexylum</i>	1
119	<i>Citrus</i>	2
120	<i>Claoxylon</i>	2
121	<i>Clausena</i>	2
122	<i>Cleidocarpon</i>	1
123	<i>Cleistanthus</i>	3
124	<i>Clerodendrum</i>	1
125	<i>Cleyera</i>	1
126	<i>Cnestis</i>	1
127	<i>Codiocarpus</i>	1
128	<i>Coffea</i>	1
129	<i>Colona</i>	3
130	<i>Colvillea</i>	1
131	<i>Coptosapelta</i>	1
132	<i>Cordia</i>	11
133	<i>Cornus</i>	4
134	<i>Corylopsis</i>	1
135	<i>Corylus</i>	1

No.	Genus	Number of species
136	<i>Corypha</i>	2
137	<i>Craibiodendron</i>	3
138	<i>Crateva</i>	3
139	<i>Cratoxylum</i>	4
140	<i>Croton</i>	4
141	<i>Crudia</i>	1
142	<i>Cryptocarya</i>	6
143	<i>Cupressus</i>	1
144	<i>Cyathocalyx</i>	2
145	<i>Cynometra</i>	2
146	<i>Dacrycarpus</i>	1
147	<i>Dacrydium</i>	1
148	<i>Daemonorops</i>	1
149	<i>Dalbergia</i>	25
150	<i>Daphniphyllum</i>	3
151	<i>Debregeasia</i>	3
152	<i>Decaspermum</i>	1
153	<i>Dehaasia</i>	2
154	<i>Dendrocide</i>	2
155	<i>Dendropanax</i>	1
156	<i>Derris</i>	3
157	<i>Dialium</i>	1
158	<i>Dichapetalum</i>	4
159	<i>Dillenia</i>	7
160	<i>Dimocarpus</i>	1
161	<i>Dioecrescis</i>	1
162	<i>Diospyros</i>	38
163	<i>Diploknema</i>	1
164	<i>Diplospora</i>	3
165	<i>Dipterocarpus</i>	10
166	<i>Discospermum</i>	1
167	<i>Distylium</i>	1
168	<i>Dodecadenia</i>	1
169	<i>Dodonaea</i>	1
170	<i>Dolichandrone</i>	4
171	<i>Dracontomelon</i>	2
172	<i>Drimycarpus</i>	1
173	<i>Drypetes</i>	10
174	<i>Duabanga</i>	1
175	<i>Durio</i>	3
176	<i>Dysoxylum</i>	6
177	<i>Ehretia</i>	7
178	<i>Elaeocarpus</i>	21
179	<i>Ellipanthus</i>	2
180	<i>Embelia</i>	2

(Continued table)

No.	Genus	Number of species
181	<i>Emmenopterys</i>	1
182	<i>Endiandra</i>	1
183	<i>Endospermum</i>	1
184	<i>Enkianthus</i>	3
185	<i>Eriobotrya</i>	6
186	<i>Eriolaena</i>	3
187	<i>Erythrina</i>	7
188	<i>Erythrophleum</i>	1
189	<i>Eucalyptus</i>	1
190	<i>Eugenia</i>	2
191	<i>Euonymus</i>	8
192	<i>Euphorbia</i>	5
193	<i>Eurya</i>	6
194	<i>Exbucklandia</i>	1
195	<i>Excoecaria</i>	4
196	<i>Falconeria</i>	1
197	<i>Fedorovia</i>	2
198	<i>Fernandoa</i>	1
199	<i>Ficus</i>	53
200	<i>Firmiana</i>	3
201	<i>Flacourtia</i>	5
202	<i>Flueggea</i>	1
203	<i>Friesodielsia</i>	1
204	<i>Garcinia</i>	16
205	<i>Gardenia</i>	4
206	<i>Garuga</i>	1
207	<i>Gironniera</i>	2
208	<i>Gleditsia</i>	2
209	<i>Glochidion</i>	19
210	<i>Gluta</i>	5
211	<i>Glyptopetalum</i>	3
212	<i>Gmelina</i>	1
213	<i>Gomphandra</i>	4
214	<i>Goniothalamus</i>	6
215	<i>Gonocaryum</i>	1
216	<i>Gordonia</i>	2
217	<i>Grewia</i>	9
218	<i>Guettarda</i>	1
219	<i>Guioa</i>	2
220	<i>Gymnocladus</i>	2
221	<i>Gynocardia</i>	1
222	<i>Gynotroches</i>	1
223	<i>Haldina</i>	1
224	<i>Haplospondias</i>	1
225	<i>Harpullia</i>	1

No.	Genus	Number of species
226	<i>Harrisonia</i>	1
227	<i>Helicia</i>	7
228	<i>Heliciopsis</i>	2
229	<i>Heritiera</i>	4
230	<i>Hesperethusa</i>	1
231	<i>Heteropanax</i>	1
232	<i>Heterophragma</i>	1
233	<i>Heynea</i>	1
234	<i>Hibiscus</i>	2
235	<i>Holarrhena</i>	1
236	<i>Holigarna</i>	4
237	<i>Holoptelea</i>	1
238	<i>Homalium</i>	8
239	<i>Hopea</i>	8
240	<i>Horsfieldia</i>	3
241	<i>Hunteria</i>	1
242	<i>Huodendron</i>	1
243	<i>Hydnocarpus</i>	6
244	<i>Hymenaea</i>	1
245	<i>Hymenocardia</i>	1
246	<i>Hymenodictyon</i>	2
247	<i>Hyptianthera</i>	1
248	<i>Ilex</i>	17
249	<i>Intsia</i>	2
250	<i>Isonandra</i>	1
251	<i>Iteadaphne</i>	1
252	<i>Ixora</i>	5
253	<i>Juniperus</i>	4
254	<i>Kandelia</i>	1
255	<i>Kayea</i>	3
256	<i>Khasiaclunea</i>	1
257	<i>Kibatalia</i>	1
258	<i>Kigelia</i>	1
259	<i>Knema</i>	5
260	<i>Kokoona</i>	2
261	<i>Kopsia</i>	1
262	<i>Kydia</i>	2
263	<i>Lagerstroemia</i>	10
264	<i>Lannea</i>	1
265	<i>Lansium</i>	1
266	<i>Larix</i>	2
267	<i>Lepisanthes</i>	5
268	<i>Leptonychia</i>	1
269	<i>Leucaena</i>	1
270	<i>Leucomeris</i>	1

(Continued table)

No.	Genus	Number of species
271	<i>Licuala</i>	3
272	<i>Limonia</i>	4
273	<i>Lindera</i>	16
274	<i>Lithocarpus</i>	25
275	<i>Litsea</i>	40
276	<i>Livistona</i>	2
277	<i>Lophopetalum</i>	6
278	<i>Lophostemon</i>	1
279	<i>Lumnitzera</i>	2
280	<i>Lyonia</i>	1
281	<i>Lysidice</i>	1
282	<i>Macaranga</i>	6
283	<i>Machilus</i>	8
284	<i>Maclura</i>	1
285	<i>Maclurodendron</i>	1
286	<i>Macropanax</i>	2
287	<i>Maddenia</i>	1
288	<i>Madhuca</i>	2
289	<i>Maesa</i>	5
290	<i>Magnolia</i>	18
291	<i>Mallotus</i>	13
292	<i>Malus</i>	2
293	<i>Mangifera</i>	7
294	<i>Manihot</i>	1
295	<i>Manilkara</i>	2
296	<i>Mansonia</i>	1
297	<i>Markhamia</i>	1
298	<i>Mastixia</i>	2
299	<i>Mayodendron</i>	1
300	<i>Maytenus</i>	1
301	<i>Melaleuca</i>	1
302	<i>Melanorrhoea</i>	2
303	<i>Melicope</i>	2
304	<i>Meliosma</i>	10
305	<i>Melochia</i>	1
306	<i>Merope</i>	1
307	<i>Merrilliopanax</i>	1
308	<i>Mesua</i>	2
309	<i>Metadina</i>	1
310	<i>Meyna</i>	1
311	<i>Microcos</i>	2
312	<i>Microdesmis</i>	1
313	<i>Micromelum</i>	5
314	<i>Microtropis</i>	7
315	<i>Miliusa</i>	10

No.	Genus	Number of species
316	<i>Millettia</i>	16
317	<i>Millingtonia</i>	1
318	<i>Mischocarpus</i>	3
319	<i>Mitragyna</i>	4
320	<i>Mitrephora</i>	5
321	<i>Morinda</i>	3
322	<i>Morindopsis</i>	1
323	<i>Morus</i>	2
324	<i>Murraya</i>	1
325	<i>Mussaenda</i>	1
326	<i>Myrcia</i>	2
327	<i>Myristica</i>	8
328	<i>Myrsine</i>	3
329	<i>Nageia</i>	1
330	<i>Nauclea</i>	1
331	<i>Nayariophyton</i>	1
332	<i>Neillia</i>	2
333	<i>Neolamarckia</i>	1
334	<i>Neolitsea</i>	2
335	<i>Neonauclea</i>	3
336	<i>Neoscortechinia</i>	1
337	<i>Nephelium</i>	4
338	<i>Niebuhrria</i>	1
339	<i>Nothaphoebe</i>	1
340	<i>Nothapodytes</i>	1
341	<i>Nypa</i>	1
342	<i>Nyssa</i>	2
343	<i>Ochrocarpos</i>	1
344	<i>Ocotea</i>	1
345	<i>Oleoxylon</i>	1
346	<i>Oreocnide</i>	2
347	<i>Ormosia</i>	4
348	<i>Orophea</i>	3
349	<i>Oroxylum</i>	1
350	<i>Ostodes</i>	2
351	<i>Pajanelia</i>	1
352	<i>Palaquium</i>	3
353	<i>Paradombeya</i>	2
354	<i>Parameria</i>	1
355	<i>Paramignya</i>	2
356	<i>Paranephelium</i>	1
357	<i>Parasassafras</i>	1
358	<i>Parashorea</i>	2
359	<i>Parishia</i>	1
360	<i>Parkia</i>	4

(Continued table)

No.	Genus	Number of species
361	<i>Payena</i>	2
362	<i>Pellacalyx</i>	1
363	<i>Peltophorum</i>	2
364	<i>Pemphis</i>	1
365	<i>Pentace</i>	2
366	<i>Pentacme</i>	1
367	<i>Peronema</i>	1
368	<i>Persea</i>	3
369	<i>Phoebe</i>	5
370	<i>Phoenix</i>	1
371	<i>Photinia</i>	5
372	<i>Phyllanthus</i>	7
373	<i>Picea</i>	3
374	<i>Pieris</i>	1
375	<i>Pinanga</i>	4
376	<i>Pinus</i>	4
377	<i>Pistacia</i>	1
378	<i>Pithecellobium</i>	1
379	<i>Pittosporopsis</i>	1
380	<i>Pittosporum</i>	3
381	<i>Placolobium</i>	1
382	<i>Planchonella</i>	3
383	<i>Podocarpus</i>	5
384	<i>Polyalthia</i>	11
385	<i>Pongamia</i>	1
386	<i>Popowia</i>	2
387	<i>Populus</i>	2
388	<i>Premna</i>	13
389	<i>Protium</i>	1
390	<i>Prunus</i>	27
391	<i>Pseudoclausena</i>	1
392	<i>Pseuduvaria</i>	4
393	<i>Psydrax</i>	1
394	<i>Pterocarpus</i>	2
395	<i>Pterocymbium</i>	1
396	<i>Pterospermum</i>	10
397	<i>Pterygota</i>	1
398	<i>Putranjiva</i>	1
399	<i>Pygeum</i>	2
400	<i>Pyrenaria</i>	4
401	<i>Pyrus</i>	7
402	<i>Quercus</i>	30
403	<i>Radermachera</i>	2
404	<i>Rapanea</i>	2
405	<i>Reevesia</i>	2

No.	Genus	Number of species
406	<i>Rhizophora</i>	1
407	<i>Rhodamnia</i>	1
408	<i>Rhododendron</i>	17
409	<i>Rhodoleia</i>	1
410	<i>Rhus</i>	5
411	<i>Riccardia</i>	1
412	<i>Rinorea</i>	3
413	<i>Rothmannia</i>	2
414	<i>Ryparosa</i>	1
415	<i>Saccus</i>	1
416	<i>Salacca</i>	3
417	<i>Salacia</i>	2
418	<i>Salix</i>	4
419	<i>Sambucus</i>	1
420	<i>Sandoricum</i>	1
421	<i>Sapindus</i>	5
422	<i>Saraca</i>	3
423	<i>Sarcochlamys</i>	1
424	<i>Sarcosperma</i>	2
425	<i>Saurauia</i>	6
426	<i>Sauropus</i>	2
427	<i>Scaphium</i>	1
428	<i>Schefflera</i>	13
429	<i>Schima</i>	6
430	<i>Schleichera</i>	2
431	<i>Scolopia</i>	6
432	<i>Scyphiphora</i>	1
433	<i>Scyphopetalum</i>	1
434	<i>Searsia</i>	1
435	<i>Semecarpus</i>	11
436	<i>Senna</i>	2
437	<i>Sesbania</i>	2
438	<i>Shirakiopsis</i>	2
439	<i>Shorea</i>	15
440	<i>Sideroxylon</i>	1
441	<i>Sindora</i>	2
442	<i>Sinoadina</i>	1
443	<i>Siphonodon</i>	1
444	<i>Sloanea</i>	7
445	<i>Sonneratia</i>	1
446	<i>Sorbus</i>	17
447	<i>Soymida</i>	1
448	<i>Sphaerocoryne</i>	1
449	<i>Sphaerosacme</i>	1
450	<i>Spiraea</i>	4

(Continued table)

No.	Genus	Number of species
451	<i>Spondias</i>	3
452	<i>Stephegyne</i>	1
453	<i>Sterculia</i>	16
454	<i>Stereospermum</i>	5
455	<i>Stranvaesia</i>	1
456	<i>Streblus</i>	7
457	<i>Styrax</i>	10
458	<i>Sumbaviopsis</i>	1
459	<i>Suregada</i>	2
460	<i>Swintonia</i>	3
461	<i>Symplocos</i>	26
462	<i>Syzygium</i>	59
463	<i>Tabebuia</i>	1
464	<i>Talipariti</i>	1
465	<i>Tamilnadia</i>	1
466	<i>Taonabo</i>	1
467	<i>Tarenna</i>	5
468	<i>Tarennoidea</i>	1
469	<i>Tectona</i>	2
470	<i>Terminalia</i>	17
471	<i>Terminthia</i>	1
472	<i>Ternstroemia</i>	2
473	<i>Tetradium</i>	3
474	<i>Thespesia</i>	1
475	<i>Toona</i>	1
476	<i>Touchiroa</i>	1
477	<i>Toxicodendron</i>	1
478	<i>Trachycarpus</i>	1
479	<i>Trema</i>	4
480	<i>Trevesia</i>	1
481	<i>Trevia</i>	1
482	<i>Triadica</i>	1
483	<i>Trigonostemon</i>	2
484	<i>Tripterygium</i>	1
485	<i>Tristaniopsis</i>	2
486	<i>Trivalvaria</i>	2
487	<i>Tsuga</i>	1
488	<i>Ulmus</i>	1
489	<i>Urophyllum</i>	1
490	<i>Vaccinium</i>	1
491	<i>Vatica</i>	9
492	<i>Vernicia</i>	1
493	<i>Vernonia</i>	3
494	<i>Vismianthus</i>	1
495	<i>Vitex</i>	13

No.	Genus	Number of species
496	<i>Wallichia</i>	3
497	<i>Walsura</i>	4
498	<i>Webera</i>	1
499	<i>Wendlandia</i>	13
500	<i>Wetria</i>	1
501	<i>Woodburnia</i>	1
502	<i>Wrightia</i>	3
503	<i>Xanthophyllum</i>	4
504	<i>Xantolis</i>	3
505	<i>Xerospermum</i>	3
506	<i>Xylia</i>	1
507	<i>Xylocarpus</i>	3
508	<i>Xylosma</i>	1
509	<i>Zanthoxylum</i>	9
510	<i>Zollingeria</i>	1
	Total	1891

5. Discussion

Myanmar tree flora is very diverse and rich while the botanical explorations are still needed to fully cover the different ecosystems of Myanmar. Research cooperation with international organizations mainly contributes to the recent discoveries of many new species and new records. In this regard, the current status of species occurrences can be easily tracked for recent collection-based description but maybe more efforts are needed to track for old collection-based description because species occurrence data is very useful for conservation assessment.

The botanical explorations still remain under-represented to cover the whole diversity of Myanmar tree flora. In consequence, many species might remain unexplored and are expected to be discovered in further studies. But there are some major threats to species survival such as habitat loss due to deforestation and land use change. Under such threats, some species might be locally extinct before recorded their occurrences and distribution in Myanmar. In order to counteract such threats, botanical explorations are urgently needed to better understand tree biodiversity of Myanmar and to take proactive conservation measures. The future botanical explorations on tree flora of Myanmar will contribute to better understanding of Myanmar tree flora and also contribute to the biodiversity conservation and research in Myanmar.

As for tree species conservation, there are various conservation actions and approaches all over the world. Habitat status is directly linked to tree species survival and conservation. In this regard, assessment on public perceptions on tree species and its conservation shall be needed for effective tree species conservation. In terms of socio-economic dimension, various approaches for livelihood sustainability and innovative approaches for development of nature-based industry will become key factors for effective tree species conservation in Myanmar.

6. Conclusion

The present study provides the updated checklist of Myanmar tree flora which will be useful for biodiversity conservation in Myanmar. The present study is mainly based on herbarium specimen sheets available, relevant literature and online databases. The present study will highlight the species richness of Myanmar tree flora by providing the species checklist to all stakeholders who are directly or indirectly related to forest resource management and conservation as well as forest-based industries.

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Appendix 1

Updated Checklist of Myanmar Tree Flora can be seen from the link:

https://drive.google.com/drive/folders/1XPt51IyFGj9Ej-aBj5rZVfzvfNELoidj?usp=drive_link