ISSN 0915-4914

NEWSLETTER OF HIMALAYAN BOTANY

Number 46 October 2012

THE SOCIETY OF HIMALAYAN BOTANY TOKYO

Botanical expedition to Natma Taung (Mt. Victoria) National Park, Chin State, west-central Myanmar in 2012

Kazumi Fujikawa[1], Motohiro Hamaguchi[1], Nobuko Yamamoto[2], Hiroshi Ikeda[3], Prachaya Srisanga[4] and Tin Mya Soe[5]
[1]The Kochi Prefectural Makino Botanical Garden, 4200-6 Godaisan, Kochi 781-8125, Japan
[2]Graduate School of Informatics, Okayama University of Science, 1-1 Ridai-cho, Kita-ku, Okayama 700-0005, Japan
[3]The University Museum, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan
[4]Queen Sirikit Botanic Garden, P.O. Box 7, Maerim, Chiang Mai 50180, Thailand
[5]Natma Taung National Park, Nature and Wildlife Conservation Division, Forest Department, Kanpetlet Township, Chin State, Myanmar

Introduction

Myanmar is a biodiversity-rich country located to the southeast of the Himalayan region. Although a checklist by Kress et al. (2003) reported ca. 11,800 species of spermatophytes, it is still far to understand the flora of this country because of the great lack of specimens collected by Burmese and foreign botanists for a long time throughout the country. Thus, Myanmar has been called one of the botanical frontier in Asia. Under these circumstances, the Forest Department (FD), the Ministry of Environment Consevation and Forestry (moECAF), Union of Myanmar, and Kochi Prefectural Makino Botanical Garden (MBK) have jointly started a project "Inventory and Research Program of the Useful Plants of Myanmar" since 2000 under the Memorandum of Understanding (MoU).

Of the six forest policy imperatives prescribed by MoECAF, the first imperative of protection involves safeguarding water catchments, ecosystems, biodiversity and plant and animal genetic resources, soil, scenic reserves, and national heritage sites. Accordingly, the FD established the protected area systems of national parks and wildlife sanctuaries, and to date, 34 protected areas have been notified (Soe Win Hlaing 2008). Natma Taung National Park was founded in 1994 encompasses a well-preserved biota chracterized by a range of forest communities and high plant species endemism (Mill 1995). FD and MBK are currently conducting a program supported by Japan International Cooperation Agency (JICA) since 2007 in Natma Taung National Park to undertake fundametal scientific research to document Myanmar's botanical heritage and to screen itscomponents for products of economic potential (Koyama 2009).

This article reports a recent expedition of the project conducted in Natma Taung National Park during the dry season in February 2012 collaborated with the University of Tokyo (the Japan Society for the Promotion of Science, Japan, Scientific Research (A), No.23255005 to H. Ikeda). All specimens and chemical analysis samples collected during the trip were dried at the office of Natma Taung National Park, Nature and Wildlife Conservation Division (NWCD), FD, Kanpetlet Township, Chin State, Myanmar.

Location

Natma Taung National Park is located at 21°12'N, 93°35'E, close to the border with India and Bangladesh. Natma Taung (Mt. Victoria) stands 3053 m above sea level, the highest mountain in the so-called Chin Hill, in Chin State, west-central Myanmar (Fig. 1). The national park encompasses 722.6 km^2 of rugged and verdant mountainous terrain. The Chin Hills form part of the Arakan-Yoma range, a fold mountain belt uplifted in the Miocene epoch that skirts the Bay of Bengal and bears northwards along Myanmar's western border. From here the peaks rise

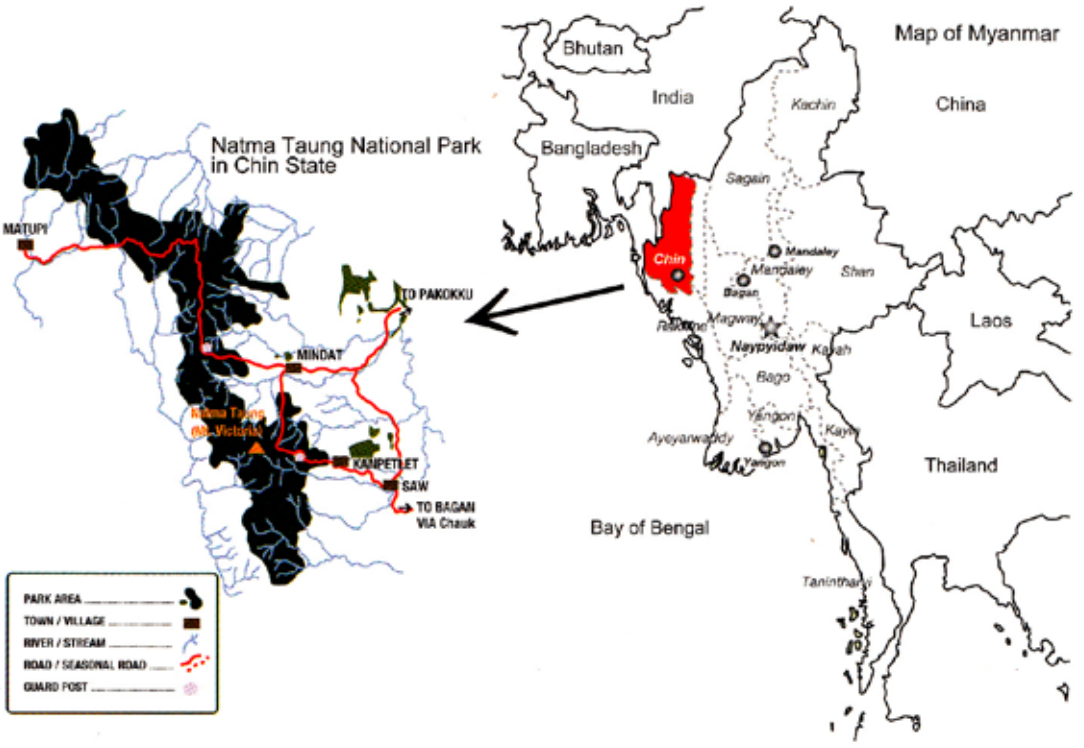

Fig. 1. Location of Natma Taung National Park in Chin State, Myanmar.

steadily in elevation until they meet the Himalayas in Manipur, northeast India.

Vegetation (quoted from Fujikawa et al. 2008 and 2009)

Natma Taung has diverse vegetation resulting from the combined effects of geography, elevation, and human activities, whose vegetation types are roughly as illustrated in Fig. 2. The ridge around the Kanpetlet Township at an altitude of 1200 m mostly support the local human population and a secondary forest consisting mainly of fast growing trees with wind-dispersed seeds such as pine and alder. Slopes lower than 1000 m are dominated by species of *Dipterocarpus* and *Shorea* in a so-called dipterocarp forest. Extensive pine forests appear on dry ridges up to about 1800 m. Oak forests occupy moist valleys on the southern slopes furthur up. As the stature of the oak forest diminishes above 2700 m, the canopy thins and *Rhododendron* becomes increasingly prominent. The northern slopes p to about 2500 m are dominated by laurel and stone oak forest. The summit of Natma Taung itself is clothed in open meadow.

Collections around Natma Taung National Park

A total of 665 herbarium specimens were collected. Although these specimens are still under investigation, at least 252 genera in 108 families have been recognized preliminarily. In addition to the floristic collections, we could collect good materials for further taxonomical studies of Rosaceae including *Docynia, Eriobotrya, Fragaria, Photinia, Potentilla, Prunus, Rosa, Rubus,* and *Sorbus,* and of Asteraceae including *Ainsliaea, Anaphalis, Blumea, Himalaiella, Senecio, Synotis, Vernonia,* etc. Moreover, to find out potentail natural resources in the forest, we carried out field surveys of supposed allies to Japanese medicinal herbs such as *Achyranthes bidentata, Astragalus* cf. *chlorostacys, Indigofera, Bupleurum candollei, Ru-*

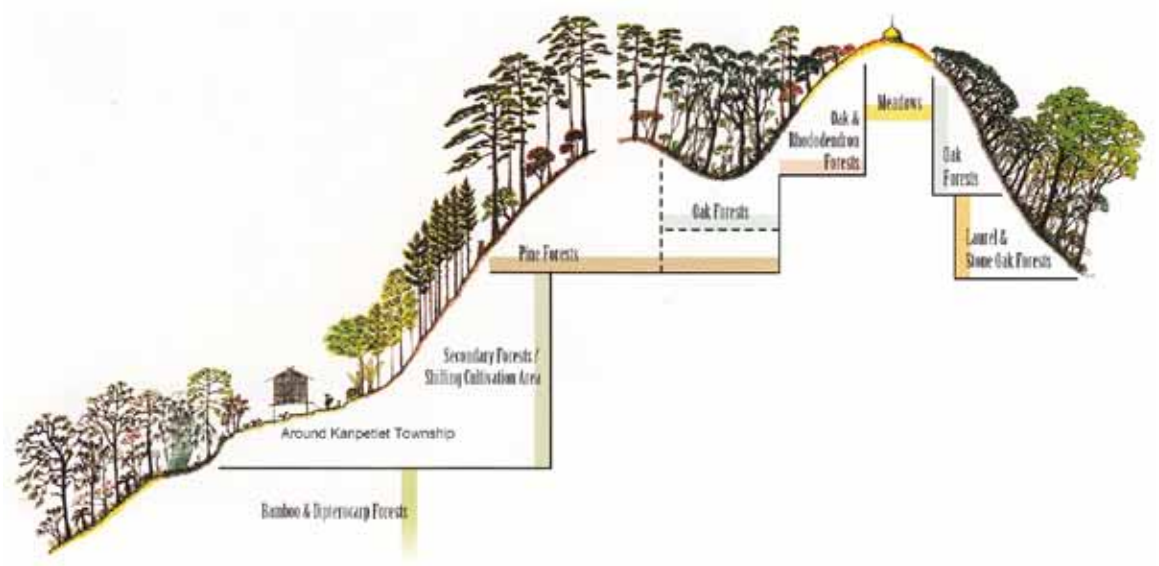

Fig. 2. Vegetation types of Natma Taung National Park (quoted from Fujikawa et al. 2008).

bia sikkimensis (Fig. 3), and *Acornus calamus* and collected dried materials to compare their chemical components with those of Japanese allies.

Access from Yangon to Natma Taung National Park, Chin State

Natma Taung National Park is best accessed from Bagan, Mandalay Division, a popular tourist destination that is serviced by domestic flight from Yangon. From the ancient city of Bagan on a 140 km journey across the Ayeyarwady plains, the park can be reached by jeep via Chauk, Magway Division. It usually takes 6-8 hours drive from Bagan to Natma Taung National Park, but it depends on the condition of the road and vehicles.

We departed from Yangon Airport at 6:00 am on 10 February and, after an hour flight, we arrived at Bagan/Nyang U Airport at 7:10 am. Ms. Myint Myint San, research assistant of Forest Research Institute (FRI), Yezin, Nay Pyi Taw, collaborate researcher from FD, and Mr. Wai Min Htay, guide/Translator (Japanese-Burmese) for our botanical expedition, met with us, and we intriduced each other at the airport. All the members got on three jeeps and left for Natma Taung National Park. Between Bagan and Chauk, we could see ground nut fields with planta-

Fig. 3. *Rubia sikkimensis.*

tions of sugar palms. Chauk is a large town and river port in Magway Division on the Ayeyarwady river and the last place to buy a large amount of newspapers. We gathered them and copied our passport, visa, and entry permission for an hour.

After crossing the Ayeyarwady river partly utilizied for agriculture, the vast rocky plains were dotted with low trees and shrubs, primarily of Leguminosae and Euphorbiaceae, forming a mosaic of open woodland and savanna. Continuing west, the backbone of the Arakan mountain range and its foothills beneath soon loomed into view. In early February, it was very dry in the seasonal rain forest, but the colourful blooms of *Butea monosperma* was worth looking out for (Fig. 4).

Fig. 4. *Butea monosperma*

Fig. 5. Saw in a valley of the Saw river.

Fig. 6. Mountain Oasis Resort Guest House.

We arrived at Saw located at the foot of Ntma Taung in a green valley of the Saw river at 17:30 pm (Fig. 5). From Saw, the road rises steeply up to Kanpetlet township, the gateway to Natma Taung National Park. Traveling up from Saw, we first passed through the dipterocarp forest and bamboo groves covering the lower slopes up to about 1000 m. At Kanpetlet township on a ridge at 1200m, accommodations are available in the guesthouse, though foreign visitors are restricted from entering freely into Chin State. After the long drive from Bagan, we arrived at the stronghold here of the Mountain Oasis Resort Guest House at 1600 m located at the end of a town at 18:45 pm (Fig. 6).

Kanpetlet area

Kanpetlet, the gateway to the summit of Natma Taung, has a population of about 3000 people, and is complete with school and a township hospital in southern Chin State (Fig. 7). The park office of FD is located here, and the total of 31 staff members (one park warden, one head office staff, one range officer, nine rangers, thirteen foresters, one sub-forester and five daily workers) are working on thier duties. Around Kanpetlet, natural vegetation largely gave way to the secondary woodland following repeated clearance for shifting agriculture.

Fig. 7. Kanpetlet.

The expedition's first collections started from the next day on 11 February accompanied by Ms. Ling Shein Man and Mr. Law Shein, the ranger and forester of FD staff members at the park office who had joined the field work during our previous stay in Natma Taung National Park. We carried out the field trip at the Kanpetlet area including a day trip to the summit of Natma Taung from 11 to 22 February excluding three nights'short trip to the Mindat area from 16 to 19 February and one day trip around Saw on 14 February.

Fig. 8. *Rhododendron arboreum.*

On the first and second days, we went up by Jeep to the evergreen forest occurring on the north-facing slopes and restricted to sheltered, moist valleys on the southern slopes, the pine forest (*Pinus kesiya*) along exposed ridges and dry outcrops forming virtually pure stands with vibrant *Rhododendron arboreum* (Fig. 8) and *Lyonia ovalifolia* between 2000-2700 m, and the secondary forest around 1800 m. At moist places, evergreen forests mainly consisted of *Castanopsis, Lithocarpus,* and *Quercus* of Fagaceae with species of *Polystichum* and *Microlepia* ferns*, Baliospermum calycinus, Sarcococca pruniformis, Strobilanthes* spp., and members of Zingiberaceae on the forest floor. *Persicaria chinensis, Astilbe rivularis, Ardisia virens, Myrsine semiserrata, Symplocos,* and *Viburnum cylindricum* were common along the roadside. In open and/or somewhat dry places we found *Rubus ellipticus, Polygala arillata, Leucosceptrum canum, Buddleja macrostachya, Lobelia nicotianaefolia, Anaphalis margaritacea,* and *Senecio scandens* along the

roadside around 2000 m alt. Interestingly, *Bupleurum candollei* grew in different habitats of both shady and sunny places. Himalayan cherry, *Prunus cerasoides,* were fruiting , and *Alnus nepalensis* and *Schima wallichii* occurred together around 1800 m alt.

After two days of collection in the national park, we walked the trail between Kanpetlet and Yelong Pan village on 13 February. This village is one of the model villages of the JICA grass roots program cooperated with FD-JICA-MBK, and there is a good preserved community forest. A key objective of the MBK cooperative efforts in Myanmar is to safeguard local liveihoods, whilst ensuring the conservation of plant diversity and the sustainable use of natural resources under the JICA program. To achieve the aim in the program, MBK have distributed Wa-U (local *Amorphophallus* species), which is one of the promising cash crops as non-timber forest products (NTFPs) in this area (Fig. 9). The vegetation on the way to Yelong Pan village was comparatively affected by human activities, and sub-tropical species were mixed on the lower altitude between 1250-1450 m and on the south or east facing slopes. We collected *Ficus hispida, Morus alba, Bauhinia variegata, Helicia nilagirica, Clematis buchananiana, Docynia indica, Mucuna pruriens, Trevesia palmata, Maesa* cf. *indica, Tournafortia hookeri, Colquhounia elagans, Vernonia divergens* (Fig. 10), and *Inula cappa.*

Fig. 9. Wa-U (local *Amorhophallus* species).

Fig. 10. *Vernonia divergens.*

Fig. 11. *Potentilla montisvictoriae.*

For the collection around the summit of Natma Taung, we went up to the 10 miles base camp by jeep and walked from there on 15 February. When we climbed up the trail to the summit, we found *Potentilla montisvictoriae* H. Ikeda and H. Ohba, endemic to Natma Taung National Park, that just started to bloom (Fig. 11). *Potentilla montisvictoriae* was described from specimens deposited at the Royal Botanic Garden Edinburgh, Scotland, collected by F. Kingdon-Ward on Mt. Victoria (Natma Taung) (Ikeda & Ohba 1995).

Fig. 12. *Primula denticulata.*

This species is similar to *P. leuconota* D. Don that are widely distributed in the Himalayan region, but differs in the nature of stipules.

Open scattered forests of *Rhododendron arboreum* and *Quercus semecarpifolia* occurred at altiudes up to the meadow zone. Montane meadows dominated above the forest line to the peak of the mountain (3053 m altitude), which was covered with a continuous carpet-like vegetations. In February, *Primula denticulata* Sm. was blooming conspicuously (Fig. 12). We enjoyed trekking with collection such as *Ranunculus, Daphne papyracea, Viola, Rhodendron arboreum, Symplocos, Gentiana, Ainsliaea latifolia, Myriactis wallichii, Synotis pseudoalata,* and *Himalaiella natmataungensis,* that was recently described as a new species on March 2012 (Fujikawa & Shein Gay Ngai 2012). *Himalaiella natmataungensis* is similar to the Himalayan species of *H. auriculata* in sharing a nodding capitulum with long flowering stalks and linear or narrowly lanceolate involucral phyllaries, but differs from it in having pinnately parted leaves and whitish colored corolla (Fig. 13).

Fig. 13. *Himalaiella natmataungensis.*

After coming back from Mindat, H. Ikeda, N. Yamamota, P. Srisanga, Ms. Myint San, Ms. Ling Shein Man, and Mr. Law Shein went to the forest composed of tall and dense evergreen trees along the road between 10 and 12 miles from the entrance of the natinal park on 20 and 21 February. We found *Arisaema wattii* (Fig. 14), *Primula* sp. (Fig. 14), *Taxus wallichiana* var. *mairei, Mahonia nepalensis,* and *Cornus capitala,* and dominant trees were represented by *Castanopsis, Lithocar-*

Fig. 14. *Arisaema wattii* (left) and *Primula* sp. (right).

pus, and *Quercus* species of Fagaceae, and members of Lauraceae.

Midat area

Mindat township, the capital of the Southern Zogam (Mindat District), is located at the northeast of Natma Taung in 21°19'-21°47' N and 93°23'-94°29' E at 1400 m alt. (Fig. 15). Although this area seems to have a rich flora, limited botanical inventory has been carried out, and the total number of specimens collected here were only 246, far less than total 6,421 specimens were collected around Kanpetlet.

We had a short trip to the Mindat area for three nights from 16 to 19 February to add to the knowledge of the flora of Natma Taung National Park. On the first day, we departed from the guest house at 8:50 am and went up along the mountain road from Kanpetlet to Mindat via 10 miles base camp. This road is accesible only in the dry season from December to April (or May) and is usually is closed in the rainy season because of landslides. Between 10 miles base camp and 12 miles from Kanpetlet, we saw a good natural forest described above.We stopped our jeeps at 17 miles from Kanpetlet and found *Myrica esculenta, Engelhardtia spicata, Peperomia tetraphylla, Aristolochia wardiana,* and *Bupleurum candollei* along the roadside of an evergreen oak forest. When we crossed the Chi Chaung river at 840 m alt., we had a short collection time and collected *Phylacium majus, Grewia laevigata, Duabanga*

Fig. 15. Mindat.

grandiflora, Anogeissus acuminata, Buddleja asiatica, Phtheirospermum parishii, and four species of Cyperaceae, i.e., *Scirpus, Eleocharis,* and two of *Cyperus*. We arrived at Mindat at 17:00 pm after a long drive along adventure roads.

The next day we went up to 37 miles from Mindat along the 102 miles Mindat-Matupi road to the northwest of Mindat. As the road was paved and in a good condition, it took only about 2 hours to go there. Land within 10 miles of Mindat was largely used to support the local human population, and little natural vegetation remained. In the rich vegetation outside the 10 miles area, we saw white large flowers of *Michelia* sp. (Fig. 16), and *Quercus* and *Rhododendron* forests along the road farther than 16 miles. At about 37 miles at 2440 m alt., we collected *Cornus oblonga, Viburnum atrocyaneum, V cylindricum, Potentilla montisvictoriae, P.* cf. *lineta, Fragaria nilgerrensis, Hypericum henryi, H. patulum,* and *Hydrocotyle* aff. *hookeri* (Fig. 17).

Fig. 16. *Michelia* sp.

Fig. 17. *Hydrocotyle* aff. *hookeri.*

Fig. 18. *Agapetes moorei.*

On the third day we went 16 miles from Mindat by jeep and then started to walk in a scattered *Rhododendron* and *Quercus semecarpifolia* forest accompanied by *Symplocos,* and *Viburnum cylindricum* toward Long Pan village along a dirt road at ca. 2550 m alt. On the way to the village, we found *Potentilla montisvictoriae, Indigofera, Primula denticulata, Gentiana,* and *Erigeron* in forest gaps and meadow, those already observed on the trail to the summit at Natma Taung on 15 February. *Korthalsella japonica* and *Agapetes moorei* (Fig. 18) grew as epiphytes on *Quercus semecarpiifolia* along with *Rosa, Schisandra, Luculia gratissima, Rubia,* and *Smilax.* Rhizomes of *Acorus calamus, Astragalus* cf. *chlorostachys,* and *Bupleurum candollei* were gathered to analyze and compare chemical components with those of allied species used for Japanese Pharmacopeia.

On the final day of the short trip, we departed from Mindat to Kanpetlet via Saw. On the way back to Kanpetlet, we collected *Ficus auriculata, Boenninghausenia albiflora, Eranthemum,* and *Lonicera* in an evergreen forest at ca. 1300 m alt. and *Senna siamea, Canscora diffusa, Wrightia arborea, Cyathocline purpurea,* and *Vernonia squarrosa* in a dry deciduous forest at ca. 890 m between Mindat and Kangyi.

Around Saw

We went to a seasonal rain forest and a teak plantation area in the lowland at ca. 500 m alt. on 14 February. It was too dry in February for herbs to grow in a dry deciduous forest. Along a dirt road between Saw and Kangyi, we collected *Acacia, Archidendron, Crotalaria, Desmodium, Flemingia, Combretum latifolium, Haldina cordifolia, Paederia, Argyria, Merremia vitifolia, Trichodesma, Pogostemon, Lepidagathis, Blumea fistulosa, B. laciniata, Inula indica, Vernonia cinerea,* and *Dioscorea* in and around the teak plantation area protected by FD. *Argemone mexicana* and *Homononia riparia* were found at riverside sandy places.

Itinerary

10 Feb. 2012	Bagan (Mandalay Division) - Chauk (Magway Division) - Kazunma - Saw - Kanpetlet, Natma Taung National Park (Chin State). On the way to Natma Taung National Park, we traveled along the road from Chauk to Saw via Kazunma Village in Magway Division.
11 Feb.	Collection in evergreen forest (ca. 1800 m and ca. 2200 m altitude) of Natma Taung.
12 Feb.	Collection in evergreen forest on the southern and northern slopes of Natma Taung from 2300-2700 m altitude.
13 Feb.	Collection in evergreen and secondary forest between Kanpetlet and Yelong Pan village.
14 Feb.	Collection in dry deciduous forest and Teak forest (ca. 500 m altitude) around Saw.
15 Feb.	Collection in montane forest along the trail to the top of Natma Taung, 2700-3065 m altitude.
16 Feb.	Collection in evergreen forest between Kanpetlet and Mindat via Chi Chaung.
17 Feb.	Collection in evergreen forest on 37 miles and 10 miles from Mindat, ca. 2400 m altitude.
18 Feb.	Collection along the dirt road to Long Pang village on 16 miles from Mindat, ca. 2500 m altitude.
19 Feb.	Collection in evergreen forest (ca. 830 m altitude) and in dry deciduous forest (ca. 430 m altitude) between Mindat and Saw via Kangyi.
20 Feb.	Collection in evergreen forest on the northern slopes of Natma Taung, at around 2600 m altitude. Meeting of JICA grass roots program at FD office at Kanpetlet (Fujakawa, Hamaguchi and Tin Myo Soe).
21 Feb.	Collection in secondary or/and evergreen forest at 1800-2700 m altitude. Meeting at FD office (Fujikawa, Hamaguchi, Tin Myo Soe and rangers of Model Villages).
22 Feb.	Specimens drying and identification.

23 Feb. Kampetlet - Saw - Kazunma - Chauk - Bagan.
On the way back to Bagan, we found *Bauhinia variegata, Butea monosperma, B. superba,* and *Woodfordia floribunda* in a dry deciduous forest.

Members

Kazumi Fujikawa, The Kochi Prefectural Makino Botanical Garden, Kochi, Japan.
Motohiro Hamaguchi, The Kochi Prefectural Makino Botanical Garden, Kochi, Japan.
Hiroshi Ikeda, The University Museum, The University of Tokyo, Tokyo, Japan.
Nobuko Yamamoto, Graduate School of Informatics, Okayama University of Science, Okayama, Japan.
Prachaya Srisanga, Queen Sirikit Botanic Garden, Chiang Mai, Thailand.
Myint Myint San, Forest Research Institute, Forest Department, Ministry of Environmental Conservation and Forestry (MoECAF), Myanmar.
Myint Hlaing, Kanpetlet office, Natma Taung National Park, Nature and Wildlife Conservation Division, Forest Deparment (NWCD), Forest Department, MoECAF, Myanmar (from 16th to 20th February)
Ling Shein Man, Kanpetlet office, Natma Taung National Park, NWCD, MoECAF, Myanmar.
Law Shein, Mindat office, Natma Taung National Park, NWCD, MoECAF, Myanmar.

Acknowledgements

We express our cordial thanks to Col. U Aye Myint Maung, Director General, Forest Department and U Win Naing Thaw, Director of the Nature and Wildlife Conservation Division, Forest Department, Myanmar, for their help in coordinating the expedition. Special thanks are also due to the rangers of Natma Taung National Park for their kind help during the field surveys. We wish to thank to U Aung Din, national coordinator of MBK for his generous collaboration and coordination. This research work was financial supported by Grant-in-Aid from the JICA grass roots program, Government of Japan, and the Japan Society for the Promotion of Science, Japan (Scientific Research (A), No. 23255005 to H. Ikeda).

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