Miscellanea

Tabin Scientific Expedition 1 and Inventory 1998 : Its outline and a record of actions of Museum of Nature and Human Activities, Hyogo

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Abstract

Tabin Scientific Expedition 1 and Inventory 1998 was jointly organized by Universiti Malaysia Sabah (UMS) and Sabah Wildlife Department and held at Tabin Wildlife Reserve, Sabah, Malaysia from 12th February to 30th March 1998. Museum of Nature and Human Activities, Hyogo (MNHAH) participated in the expedition based on an MOU (a memorandum of understanding) exchanged between MNHAH and UMS on 14th June 1997. In this paper an outline of the expedition and a brief information of the research works and some findings by the members of MNHAH are described.

Key Words: flora and fauna, inventory, Sabah, Tabin Wildlife Reserve, tropical rain forest

Introduction

Tabin is a Wildlife Reserve under the jurisdiction of the Sabah Wildlife Department. This Reserve consists of a rather wide area of the lowland tropical rain forest and has a great diversity of wildlife including many endemic and/or rare "endangered" species of insects, fishes, amphibia, reptiles, birds, and big and medium-sized mammals such as Sumatran rhinoceros, elephant, proboscis monkey and so on. In recent years, the forest development, which comprises mainly oil palm plantation and deforestation for the export of timber, has rapidly expanded around the reserve area and thus has produced a bad influence on fauna and flora of the reserve. In order to maintain the richness in biodiversity in Tabin Wildlife Reserve, it has been pressed to put a conservation plan into action.

At present a conservation plan for big and medium-sized mammals is being implemented as outlined in the Sabah Conservation Strategy, 1992. To complement the existing program, Universiti Malaysia Sabah (UMS) jointly with the Sabah Wildlife Department plan to carry out a scientific expedition to collect, identify, and curate specimens, in an effort to inventory both flora and fauna of Tabin Wildlife Reserve. Target organisms are invertebrates, in particular several groups of insects, fishes, amphibians, reptiles, birds and small mammals. This expedition is called Tabin Scientific Expedition 1 and Inventory 1998.

Museum of Nature and Human Activities, Hyogo (MNHAH) exchanged an MOU (a memorandum of understanding) with UMS on 14 June 1997. It expresses that the rational for this collaboration is to increase the rate of acquirement of knowledge about issues pertaining to conservation of biodiversity by creation of a working relationship between two organizations with similar aspirations. One objective to achieve the aim mentioned above is also expressed to speed up the setting up of reference collection of flora and fauna of Sabah in particular and Borneo in general in an effort to inventory the biological resources.

Based on the MOU, 11 researchers of MNHAH participated in the Tabin Scientific Expedition 1 and Inventory 1998, which was held from 12th February to 30th March 1998, and carried out research works on the systematics and the ecology of insects and plants, gathering a great amount of specimens in the tropical rain forest of Tabin Wildlife Reserve. In this paper we describe a summary of this expedition and simply report the findings which were achieved by members of MNHAH.

Location of Tabin Wildlife Reserve

Tabin is a Wildlife Reserve under the jurisdiction of the Sabah Wildlife Department with an area estimated to be about 1,225 km^2. It is situated in the center of the Dent Peninsula, north-east of Lahad Datu and lying south of the lower reaches of Segama River (Fig. 1).

Organization of the Expedition

This expedition was jointly organized by UMS and Sabah Wildlife Department. Main participating institution of UMS is Tropical Biology and Conservation Research Unit (TBCU) which was set up to achieve several aims. One of them, concerning this expedition, is to become an excellent center in the field of tropical biology research and conservation especially for the terrestrial and freshwater resources in Malaysia and the region as a whole.

Presently co-operation has been formed between TBCU and other government institution and non-government organization. At the international level TBCU works with institutions such as The Natural History Museum, International Institute of Entomology, The Royal Society, United Kingdom; National University of Singapore; Kagoshima and Hokkaido Universities, and MNHAH, Japan; Vienna Museum, Austria; Universities of Aarhus and Copenhagen, Denmark; Wurzburg University, Germany and others. The co-operation consists of collaborative research, provision of research/student funding, carrying out joint courses or joint supervision of postgraduate students.

Sabah Wildlife Department is one of the State Government's agencies which is directly involved in biodiversity conservation in Sabah. The department, within the Ministry of Tourism and Environmental Development, was established in 1988 out of the former Wildlife Section of the Forestry Department. It is legally responsible for protection of all wildlife outside the State Parks and also administers hunting licenses and the collection of birds' nests. The management of animals in the two Wildlife Reserves, Tabin and Kulamba, gazetted under the Forest Enactment, is also allocated to the Wildlife Department.

Objectives of the Expedition

The aim of this expedition is to document the flora and fauna of Tabin Wildlife Reserve in an effort to promote its conservation. This will be achieved through three objectives.

1. To collect, curate and identify and produce an inventory of the flora and fauna of Tabin Wildlife Reserve.

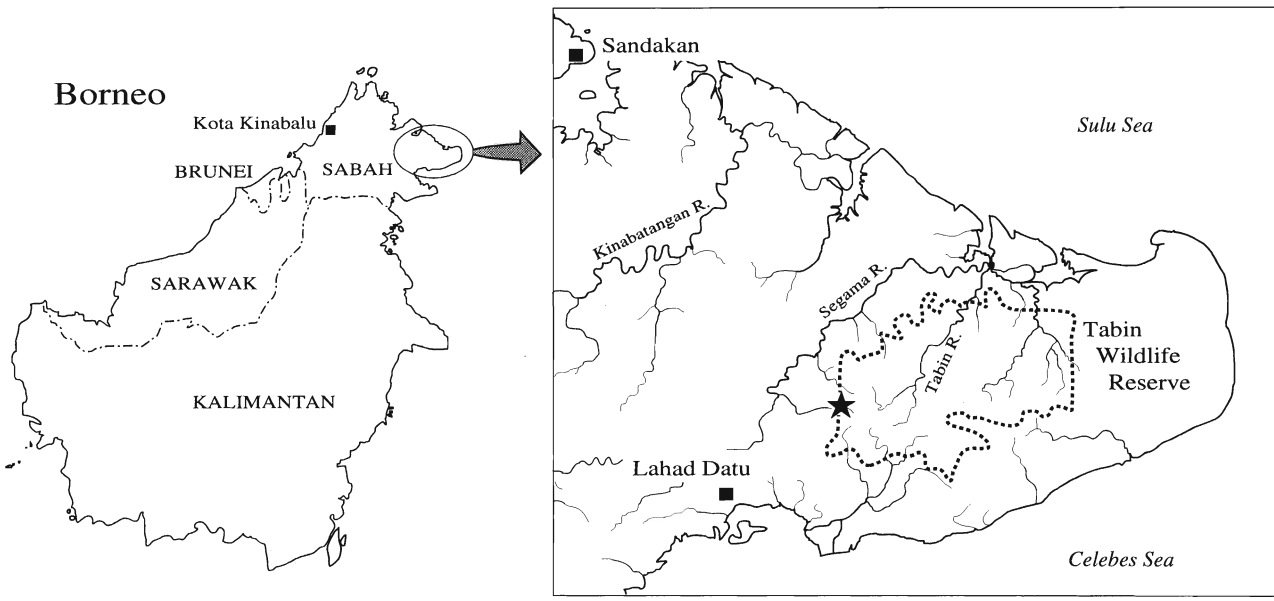

Fig.1. Location map of Tabin Wildlife Reserve, showing reserve area (dotted line) and headquarters (star).

2. To identify non-timber plants of economic importance in Tabin Wildlife Reserve.

3. To relate biodiversity to different forest types found in Tabin Wildlife Reserve.

From this expedition several scientific publications and a monograph on flora and fauna of Tabin Wildlife Reserve are requested to be produced.

Research Area and Base Camp

The headquarters of Tabin Wildlife Reserve is located at the western end of the reserve area. From the headquarters a forest road is extended in the secondary forest as far as the foot of Tabin Mud Volcano in the east (Fig. 2). Forest along the forest road is a secondary forest which was logged many years ago. The area around the Tabin Mud Volcano is known as the core area, the forest of which is primary forest predominantly consisting of dipterocarpaceous species as canopy trees and called dry dipterocarp forest (Fig. 3). Those trees are about 50 m in height and have big buttress roots (Fig. 4). At the Tabin Mud Volcano a great amount of mud slowly gushes out. The mud contains rich minerals and many wild animals, e.g. elephants, come to lick the salty mud (Fig. 5).

Base Camp of the 1st party was set in the secondary forest along the forest road about 15 km toward the east from headquarters. Base Camp of the 2nd party was located at the end of the forest road and was about 20 km far from headquarters. At the 2nd Base Camp, some bed tents, laboratory tents, kitchen and dining tents were erected in the primary forest nearby the Tabin River (Fig. 6). For meals in the Base Camp tasty Malaysian foods were prepared for all the participants (Fig. 7). We were able to spend a full time for research works in the Base Camp.

Members and Itinerary

1st party (11th-24th February 1998)

Members

Akinori NAKANISHI, Division of Phylogenetics (Systematics, Butterfly)

Yoshiaki HASHIMOTO, Division of Phylogenetics (Systematics, Formicidae)

Takeshi OHTANI, Division of Ecology (Insect Ethology)

Takeshi SUZUKI, Division of Biological Resources (Systematics, Ferns)

Toshio FUJII, Division of Biological Resources (Plant species biology)

Itinerary

11 Feb. Kansai Airport = Bandar Seri Begawan (Brunei) = Kota Kinabalu (Malaysia)

12 Feb. Kota Kinabalu = Lahad Datu = Tabin Wildlife Reserve Base Camp (BC) (N5°12'09", E118°37'02")

13 Feb. (AM) Around BC, along forest road to Headquarters (HQ) toward west, ca. 2 km away from BC. Secondary forest. (120-140 m alt.)
(PM) Around BC, along forest road to core area toward east, ca. 2 km away from BC. Secondary forest. (120-220 m alt.)
Light trap

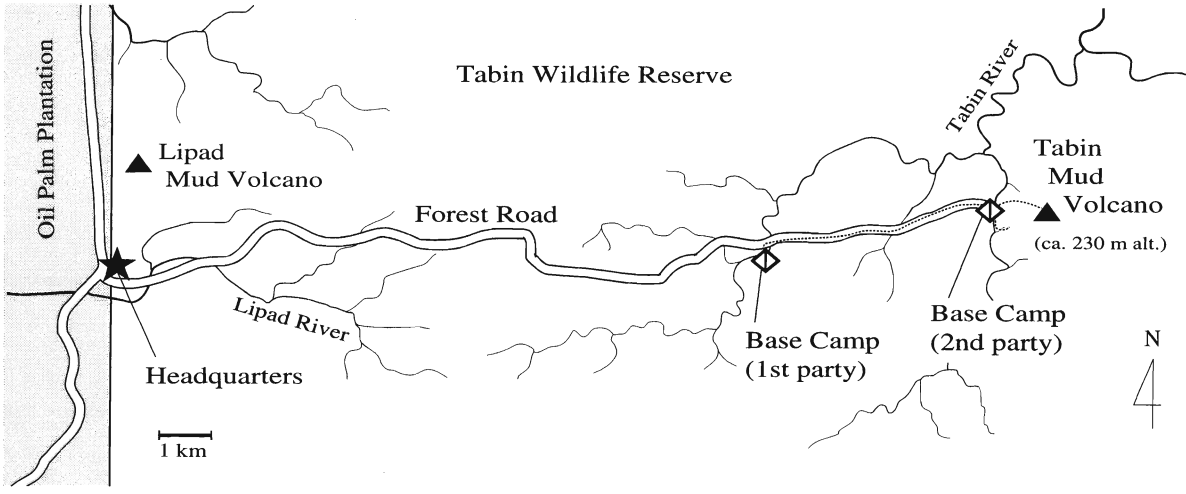

Fig.2. A map of the research area in Tabin Wildlife Reserve, showing the camp sites of 1st party and 2nd party.

In the evening, a light trap was prepared at an open place on the forest road some way from BC. We could collect many kinds of moths, orthopteran and other insects (Fig.8).

14 Feb. From BC to core area, ca. 6 km away from BC toward east, up to Tabin Mud Volcano. Primary forest and secondary forest. (80-220 m alt.)

We walked up and down the forest road to the core area in the intense heat of tropical region. All the members became tired before their collections in the primary forest were finished in the afternoon.

15 Feb. (Hashimoto, Suzuki, Fujii) At core area, ca. 6 km away east from BC. By riverside of Tabin River, slightly up slope. (80-140 m alt.).

Younger members went to the core area again and could collect many kinds of epiphytic ferns growing on tree trunks near the river (Fig. 9).

(Nakanishi, Ohtani) (AM) Around BC, along forest road to HQ toward west, ca.2 km away from BC. Secondary forest. (120-140 m alt.); (PM) Shopping in Lahad Datu. Around HQ to Lipad Mud Volcano.

16 Feb. Around HQ to Lipad Mud Volcano. Primary and secondary forest. (80-130 m alt.)

17 Feb. (Hashimoto, Suzuki, Fujii) At core area, ca. 6 km away east from BC. By riverside of Tabin River, slightly up slope. (80-140 m alt.)

(Nakanishi, Ohtani) Around BC, along forest road to core area toward east, ca. 2 km away from BC. Secondary forest. (120-140 m alt.)

18 Feb. In secondary forest, ca. 1.2 km west from BC. (100-150 m alt.)

Light trap

19 Feb. Along upstream of Lipad River, ca. 1.5 km west from BC. Secondary forest. (80-140 m alt.)

All the members prepared their collection lists and submitted them to Mr. Peter Malim Titol. The lists were attached to certification letters of permission to bring specimens out to Japan.

20 Feb. Along trail to Lipad River, water fall near HQ. Primary forest. (120-160 m alt.). Farewell party.

21 Feb. BC = Lahad Datu = Kota Kinabalu

22 Feb. Kota Kinabalu (Sabah Museum)

23 Feb. Kota Kinabalu (UMS, TBCU, Director of Wildlife Department), Dinner with Dr. Maryati and Dr. Noh.

24 Feb. Kota Kinabalu = Bandar Seri Begawan (Brunei) = Kansai Airport

2nd party (4th-17th March 1998)

Members

Akira TAKAHASHI, Division of Phylogenetics (Plant morphology, Wood anatomy)

Yoshihisa SAWADA, Division of Phylogenetics (Systematics, Beetle)

Tsuyoshi YAGI, Division of Phylogenetics (Systematics, Diptera)

Hiroshi SATO, Division of Earth Sciences (Environmental science, Algae)

Hiroshi SAKATA, Division of Ecology (Ecology, Ants)

Hiroaki ISHIDA, Division of Biological Resources (Phytosociology)

Itinerary

4 Mar. Kansai Airport = Bandar Seri Begawan (Brunei) = Kota Kinabalu (Malaysia)

5 Mar. Kota Kinabalu = Lahad Datu = Tabin Wildlife Reserve Base Camp (N5°11'45", E118° 39'22")

6 Mar. (Takahashi, Sato, Sakata, Yagi, Ishida) BC -- Tabin Mud Volcano (230 m alt.: N5°11'48", E118° 40'07") -- BC

(Sawada) Around BC

7 Mar. (Takahashi, Yagi, Ishida) BC -- upstream along Tabin River -- BC

(Sato) BC --upstream along Tabin River -- BC

(Sawada, Sakata) BC -- Tabin Mud Volcano -- BC

Light trap

Light trap was prepared in the primary forest on way to the Tabin Mud Volcano.

8 Mar. (Takahashi, Ishida) BC -- primary forest (on way to Tabin Mud Volcano) -- BC

(Sato) BC -- downstream along Tabin River -- BC

(Sawada) Around BC

(Sakata, Yagi) BC -- forest road -- around BC

Light trap

9 Mar. (Takahashi, Sato, Sawada, Yagi, Ishida) BC -- upstream along Tabin River -- a branch stream -- water fall -- Tabin River -- BC

TV Malaysia staff came with us and took a video movie of our research activities. We climbed up to a small and beautiful waterfall along a branch stream which runs in the primary forest. We could see many kinds of dragonflies around the waterfall and some fishes with beautiful color in the basin of the waterfall.

(Sakata) Around BC

10 Mar. (Takahashi, Sato, Sakata, Yagi, Ishida) BC --

below Tabin Mud Volcano -- BC
(Sawada) Around BC
Light trap

11 Mar. (Takahashi) BC -- Tabin Mud Volcano -- BC
(Sawada) BC -- upstream along Tabin River -- BC
(Sakata, Yagi) BC -- Tabin River -- a branch stream -- water fall -- BC
(Ishida) BC -- primary forest (on way to Tabin Mud Volcano) -- BC
(Sato) BC = Lahad Datu = Kota Kinabalu

Sato went back to Kota Kinabalu alone to return to Japan for certain reasons.

12 Mar. (Takahashi, Sawada, Sakata, Yagi, Ishida) Around BC

A small ceremony was held to complete the expedition, in which Vice-chancellor of UMS and head of Sabah Wildlife Department exchanged an agreement on the biological research and the conservation in Tabin Wildlife Reserve. A brief exhibition was also carried out to display results and specimens obtained in this expedition (Fig. 10). In the afternoon all the members prepared their collection lists that were attached to certification letters of permission to bring specimens out to Japan.

(Sato) Kota Kinabalu

13 Mar. (Takahashi) BC = Lahad Datu = Sandakan, Forest Research Center
(Sawada, Sakata, Yagi, Ishida) Around BC
(Sato) Kota Kinabalu = Bandar Seri Begawan (Brunei) = Kansai Airport

14 Mar. (Takahashi) Sandakan = Kota Kinabalu
(Sawada, Sakata, Yagi, Ishida) BC = Lahad Datu = Kota Kinabalu

15 Mar. Kota Kinabalu = Tuaran = Mt. Kinabalu Park = Kota Kinabalu
(Dr. Maryati's home party)

16 Mar. Kota Kinabalu (Sabah Museum, UMS, TBCU)

17 Mar. Kota Kinabalu = Bandar Seri Begawan (Brunei) = Kansai Airport

Findings

Butterflies

Reported by Akinori Nakanishi, Peter Malim Titol, and Tsuyoshi Yagi

During the survey period, about 600 butterfly specimens were collected by A. Nakanishi and P. Malim Titol in February 13th to 21st and by T. Yagi in March 6th to 13th. All the specimens were taken back to Japan, relaxed, pinned and set, and thereafter sorted and identified by A. Nakanishi and T. Saigusa of Kyushu University. As a result 157 species belonging to 93 genera of 9 families could be enumerated. Up to the present only 26 species of 24 genera were recorded in Tabin Wildlife Reserve.

Ants

Reported by Yoshiaki Hashimoto

From the collection of ants in Tabin Wildlife Reserve from 13th to 20th February, 93 morphospecies (8 subfamilies, 46 genera) were enumerated. It is remarkable fact that a specimen of genus *Probolomyrmex* was found out of the collection. Genus *Probolomyrmex* has only 13 species in the world, all of which are extremely rare ants. A single specimen of this genus has been collected from Sepilok, Sabah. Thus the record of this genus in Tabin Wildlife Reserve is the second occurrence in Borneo Island.

Beetles

Reported by Yoshihisa Sawada

Total 637 beetle specimens of 35 families were collected in the tropical forest of Tabin Wildlife Reserve. For the collection along the woodland paths and footways in the forests, non-selective sweeping was not so effective but effective collection was done at the specific points such as fallen trees, manually cut trees, decayed trees, mushrooms, sprouts, forest gaps and animal stools. Yellow pan trapping was not effective for collecting beetles, while Malaise trapping enabled various insects including beetles to be collected. Collection by light at night was also an effective method to enable some species of dung beetles and tiger beetles to be collected, which cannot be collected during the day time.

The following three main taxa should be easily collected and observed in Tabin Wildlife Reserve, 1: Coprophagous Dung beetles (Scarabeidae) which gather on the stools of large animals including humans. 2: Weevils (Anthribidae and Zygopinae Curculionidae) living on the surface of fallen or cut tree stems. 3: Tiger beetles (Cicindelidae) found in the gaps or along the streams.

Diptera

Reported by Tsuyoshi Yagi

Gall midges of the subfamily Porridonydylinae are tiny fragile flies, mostly decomposers of dead tree trunks and litter, living in fungi mycelium. Several scientists have investigated them mainly in Palaearctic and Nearctic regions. However, many species remains undescribed in these regions, as well as in the tropical region.

Four sets of Towns-style Malaise trap were set up in

and along the edge of the primary forest near the base camp on March 6th to 13th, 1998. One collecting bottle of Malaise trap contained about 150 male porricondyline specimens. At least 500 males will be counted totally. In a bottle from trapping site 1 in the forest, 91 male specimens have been examined and more than 20 species belonging to 5 tribes were recognized. Other bottles are now being examined. It is reported that the tribe Winnertziini, especially the genus *Winnertzia* includes a great number of very similar species and each species displays an extreme intraspecific variability. This is because precise number of species can not be estimated now, though a considerable number of new species must be present.

The collection of gall midges in this expedition will be one of the largest collection in Asian tropical region and will be able to provide taxonomical basis for future studies.

Behavior of a tiger beetle

Reported by Takeshi Ohtani

Two species of tiger beetle *Cicindela,* one may be identified as *Cicindela aurulenta* with 8 white spots and rather bigger sized body, and another (*Cicindela* sp.) has a red U-letter pattern, were seen at the main forest road in Tabin Wildlife Reserve. The latter Malaysian tiger beetle, red U-charactered *Cicindela,* was observed in its behavior by mean of the single-individual trailing (=SIT) method designed by T. Ohtani. One female was observed to take various actions described into three categories as solitary behaviors, inter-individual behaviors, and linked behaviors. Those behavioral data will be valuable features for classification as well as many morphological characters. The behavioral data have been inputted into the "open" behavioral catalogue which shows the life of Malaysian *Cicindela.*

Ecological relationships between ants and other insects

Reported by Hiroshi Sakata

There are many symbiotic combinations of ant and Homopterans (mostly mealybugs) in the primary tropical forest of Tabin Wildlife Reserve. One of those symbioses, *Camponotus* sp. and a species of mealybug on *Microcos* sp., was investigated. The ants made approximately 200 small nests of fine wood shavings on under-surface of leaves on a tree. During this expedition 50 nests on leaves including all ants and mealybugs were collected and analyzed on the population of these insects. In each nest various sized mealybugs inhabited, large (over 2 mm in size), small (0.2-2 mm in size), and minute ones. Those individuals seem to be the same species in different stages.

As a result, it seems that the number of ant eggs and larvae is intensely restricted by number of mealybugs and large mealybugs have larger effect on ants, especially on number of larvae. Those results suggest that the distributions of ant adults, eggs and larvae were well arranged in correspondence to mealybug distributions, or that the ant may allocate mealybugs effectively to each nest.

Ferns and Seed Plants

Reported by Akira Takahashi, Takeshi Suzuki, Toshio Fujii, and Hiroaki Ishida

Tabin Wildlife Reserve has the natural vegetation covered by tropical lowland forest, where many kinds of trees and herbs are growing. Four members of plant team separately participated in the expedition on 13th to 20th February and 6th to 13th March. The plant specimens collected during this expedition contain ferns and seed plants of many families. Approximately 930 herbarium specimens were collected. Although those specimens have been under investigation, 58 species of 21 families in Pteridophyta and more than 80 species of 30 families in Magnoliophyta are recognized. The latter contains many kinds of tree families, which are commonly seen in the tropical rain forest, such as Annonaceae, Dipterocarpaceae, Euphorbiaceae, Lauraceae, Rubiaceae, and others. In this time we could see many kinds of trees in flower.

Wood anatomy

Reported by Akira Takahashi

Totally 37 wood samples were collected with fertile herbarium specimens on the set during the expedition from 6th to 11th March. For the sampling, a block of about 1.5 cm cube was extracted out of the erect trunk of each tree by means of a small saw and a chisel. Collected wood samples were fixed and preserved in 70% ethanol in the field. Those will be prepared into sections for microscopy in the laboratory and used as materials for the study of wood anatomy and growth analysis of tropical trees.

Freshwater Algae

Reported by Hiroshi Sato

A total of 25 samples containing blue green algae, red algae, and epilithic diatoms were collected from five types of habitats, muddy pool at Tabin Mud Volcano, a small stream originating from the Tabin Mud Volcano, another small stream, a tributary of the Tabin River at the base camp site, and on the leaves of Bryophyta living on the tree trunks during the expedition on 6th to 10th March. Tentatively 22 species were enumerated from those samples. Among those a red alga *Batrachospermum*

gombakense is the first record from Borneo Island and reported in detail by Anton et al. (1999).

Acknowledgements

We express our cordial thanks to Prof. Datuk Seri Panglima Dr. Abu Hassan Othman, the Vice Chancellor of Universiti Malaysia Sabah, who has permitted us Japanese members to join this expedition as advisors of the organizing committee of the expedition. Our special thanks are due to Prof. Dr. Maryati Mohamed, TBCU of Universiti Malaysia Sabah, and Prof. Dr. Mohd. Noh Dalimin, Deputy Vice Chancellor of Universiti Malaysia Sabah, for all the arrangements during the expedition and their heartful help and encouragement throughout our visit in Sabah. We are also grateful to Mr. Peter Malim Titol for his coordination and useful help in the expedition, Mr. Nordin Hj. Wahid for his helpful assistance in the field work, and all other participants from Universiti Malaysia Sabah and Sabah Wildlife Department for their collaboration. This research work was supported by a Special Research Grant from Hyogo Prefectural Government to A. Nakanishi.

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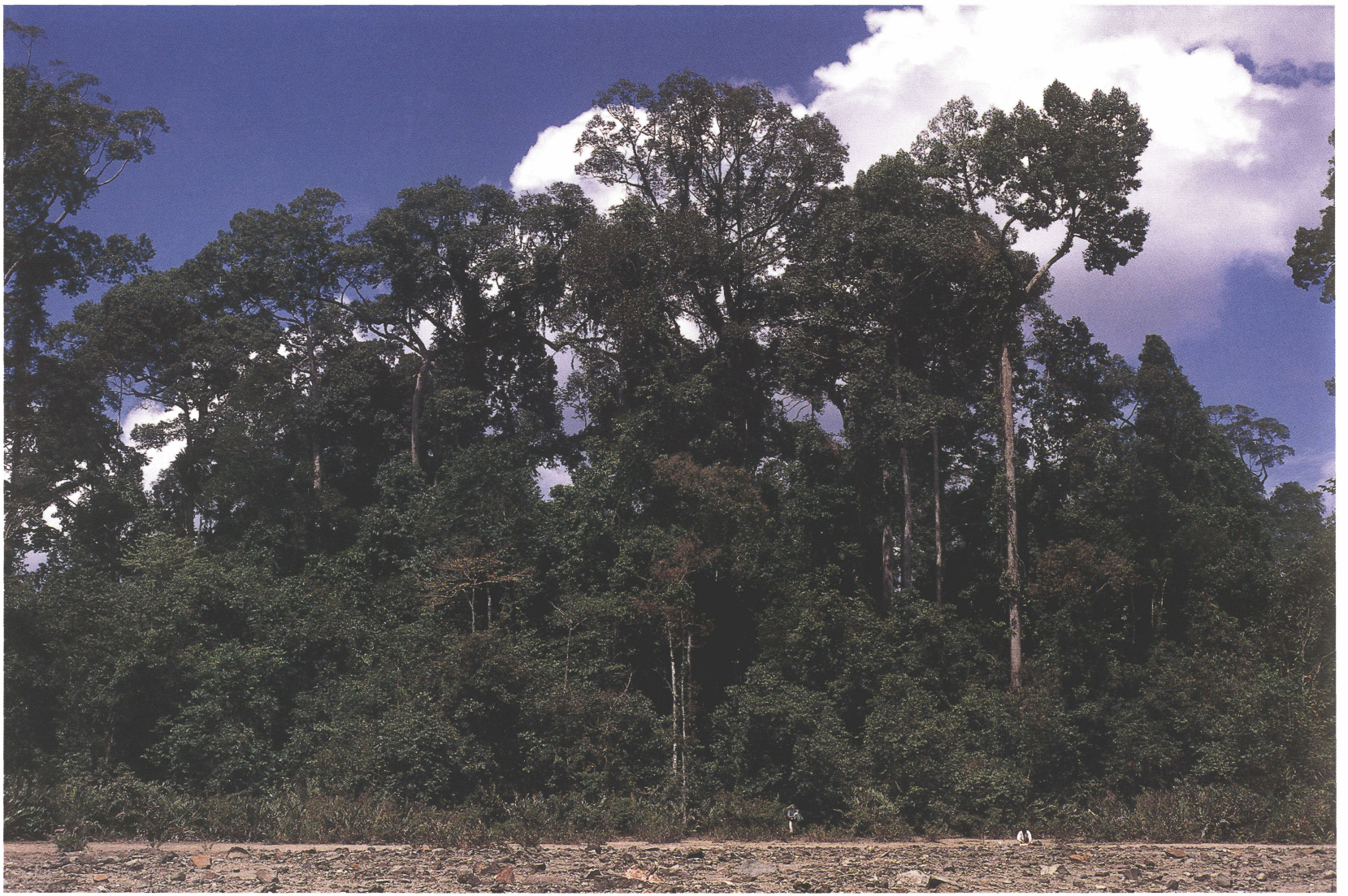

Fig. 3. Tropical rain forest in core area of Tabin Wildlife Reserve. (photo by A. Takahashi)

Fig. 4. A tree with big buttress root. (photo by T. Fujii)

Fig. 5. Foot prints of wild elephants come to lick the salty mud of the Tabin Mud Volcano. (photo by A. Takahashi)

Fig. 6. Circumstances of tent site in Base Camp of 2nd party. (photo by A. Takahashi)

Fig. 7. A meal in Base Camp on one day. (photo by T. Fujii)

Fig. 9. Members trying to collect epiphytic ferns growing on tree trunk. (photo by T. Fujii)

Fig. 8. Collection by light trap method. (photo by T. Fujii)

Fig. 10. An exhibition at the ceremony, showing Mr. Peter Malim Titol explaining display to Vice-chancellor of UMS and other guests. (photo by A. Takahashi)