

ความหลากหลายของลิเวอร์เวิร์ตบริเวณยอดเขานัน อุทยานแห่งชาติเขานัน  
จังหวัดนครศรีธรรมราช

**Liverworts diversity at the summit of Khao Nan, Khao Nan National Park,  
Nakhon Si Thammarat Province**

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Liverworts are nonvascular plants belonging to the class Hepaticopsida. Liverworts usually grow in high humidity and in shaded areas, especially in tropical rain forest at altitudes higher than 1,000 meters. The summit of Khao Nan of Khao Nan National Park, Nakhon Si Thammarat Province, is situated around 1,400 meters above mean sea level. This peak is classified as cloud forest because the forest vegetation is covered with mist and cloud nearly all year round. Therefore, this research aims to investigate the diversity of liverworts at the summit of Khao Nan. Exploration and liverwort collection in the field was carried out at elevations ranging from 1,000 to 1,400 meters above mean sea level from January 2006 to July 2006. In total, 319 specimens were collected, belonging to 33 genera and 18 families. With regard to their habitat, it was found that there were epiphytic, terrestrial, and lithophytic liverworts. Of all liverworts, those with the highest relative abundance are members of *Bazzania* found at elevations from 900 meters above mean sea level to the summit of Khao Nan. In view of species richness, Lejeuneaceae was the richest in diversity with 12 genera being found including *Acrolejeunea*, *Archilejeunea*, *Ceratolejeunea*, *Cheilolejeunea*, *Cololejeunea*, *Drepanolejeunea*, *Lejeunea*, *Leucolejeunea*, *Lopholejeunea*, *Mastigolejeunea* and *Schiffneriolejeunea*. From our preliminary sorting of liverwort specimens, it seems likely that there may be new records of liverworts for Thailand.

ความหลากหลายของเทอริโดไฟต์ในอุทยานแห่งชาติเขานัน จังหวัดนครศรีธรรมราช

## Diversity of pteridophytes in Khao Nan National Park, Nakhon Si Thammarat Province

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Diversity of pteridophytes at Khao Nan National Park was explored from March to July 2006 at elevations below 600 m mean sea level. Up to now 225 specimens were collected and 17 families, 38 genera, 66 species were determined. Among these, 3 families, 3 genera and 3 species are fern allies, while 14 families, 35 genera, 63 species are ferns. All the collected species were found in both disturbed and undisturbed forests. The disturbed areas include rubber and fruit-tree plantations scattering around the park. Some abandon mines and an active quarry also found in the park area. Among undisturbed forests Bua Chake Nature Trail is the most suitable forest trail for promotion of ecotourism. Since this nature trail is rich in plant diversity, especially pteridophytes. It is expected that new data of pteridophytes can be gain and they can be used as basic data for park management.

ความหลากหลายของชนิดกล้วยไม้ที่ระดับต่ำในอุทยานแห่งชาติเขานัน จังหวัดนครศรีธรรมราช

## Diversity of orchids in low altitude of Khao Nun National Park, Nakhon Si Thammarat Province

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Field exploration and data collection in natural orchids has been conducted at the altitude 60-600 m above sea level of Khao Nun National Park, during March to May 2006. All 37 specimens was identified and kept and Kasin Suvatabhandhu Herbarium, Department of Botany, Faculty of Science, Chulalongkorn University. Twenty seven species of epiphytic orchid, seven species of terrestrial orchid and three species of saprophytic orchids were recognized approximately in sixteen genera. Among epiphytic orchid, the *Bulbophyllum* and *Dendrobium* were the two richest genera of 6 species each while the terrestrial genera contained only one species each. *Dendrobium lobatum* (Bl.) Miq. was found to be a new recorded species to Thailand.

ความหลากหลายของพืชวงศ์ขิงในเขตอุทยานแห่งชาติเขาลวง และอุทยานแห่งชาติเขานัน

## Zingiberaceae diversity in Khao Luang and Khao Nan National Parks

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Twenty-five samples in eight genera were found in a rapid pilot study of Zingiberaceae diversity in Khao Nan National Park from January to June 2006. This study was conducted at 0-400 meters altitude from the mean sea level in the National Park area. Ten species were identified in the genera *Alpinia*, *Amomum*, *Boesenbergia*, *Curcuma*, *Etilingera*, *Globba*, *Kaempferia*, and *Zingiber*. Descriptions of the genera and species are provided together with GPS data, altitude, soil and water characterization, ecological data, distributional, ornamental and macro-pictures of flower.

ความหลากหลายของพรรณไม้สกุลมะเดื่อ-ไทร ในอุทยานแห่งชาติเขานัน  
จังหวัดนครศรีธรรมราช

**Species diversity of *Ficus* L. (Moraceae) in Khao Nan National Park,  
Nakhon Si Thammarat Province**

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The diversity of fig (*Ficus*) species at Khao Nan National Park was investigated with the main objectives to investigate and evaluate species richness, as well as their beneficial values for local people by interviewing the surrounding people. Five transect lines were set up for data collection with a total distance of about 40 kilometers. The transect lines were designed to cover all the main habitat types, hill evergreen forest, moist evergreen forest and disturbed areas. The specific identification followed the monumental works of Berg (2003a, 2003b, 2003c, 2003d, 2004), Berg & Corner (2005), Corner (1959, 1965), King (1969) and Ridley (1924) and collected materials were also compared with labelled materials in many herbaria. The results showed that 37 *Ficus* species were determined and these were divided into 6 subgenera; *Urostigma* with 14 species, *Pharmcosyceae* with 2 species, *Sycomorus* with 9 species, *Sycidium* with 5 species, *Synoecia* with 4 species and *Ficus* with 3 species. Concerning human uses, 5 fig species were used as local native food and other uses.

ความหลากหลายของแมงมุมในสภาพป่าเมฆ อุทยานแห่งชาติเขานัน  
จังหวัดนครศรีธรรมราช

**Assessment of diversity and abundance of spider of cloud forest,  
Khao Nan National Park, Southern Thailand**

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The diversity of spiders was investigated along a nature trail of Bua-Chag-Yai, Khao Nan National Park during February and April 2006. The study sites were tropical rain forests at altitudes of 140 and 240 meters above sea level. A total of 513 spiders, comprising 22 families were collected by pitfall trap, leaf litter sifting and sweep nets. The survey design for three types of method was a Completely Random Designed (CRD). The following spider families were collected and identified: Araneidae, Clubionidae, Corinnidae, Ctenidae, Dictynidae, Gnaphosidae, Hexathilidae, Liocranidae, Lycosidae, Ochyroceratidae, Onopidae, Psechridae, Salticidae, Scytodidae, Sparassidae, Stenochilidae, Tetrablemmidae, Tetragnathidae, Theridiidae, Thommisidae, Uloboridae and Zodariidae. The most abundant spider families collected belong to the Salticidae (12.5%), Araneidae (10%) and Zodariidae (8%). Of all three sampling techniques, the leaf litter sifting was the most effective which yield 56% of individuals examined.

ความหลากหลายของมด (Hymenoptera : Formicidae) ณ อุทยานแห่งชาติเขานัน

จังหวัดนครศรีธรรมราช

**Diversity of ants (Hymenoptera : Formicidae) at Khao Nan National Park,  
Nakhon Si Thammarat Province**

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This study was done to investigate the diversity of ants at Bua Chak Yai Natural Trail of Khao Nan National Park (KNNP), Nakhon Si Thammarat. Three study sites were randomly selected and a permanent plot of 30X30 m was established in each study site which were 500 m apart. Honey bait (HB), Pitfall traps (PT), Hand collection (HC), Leaf litter sifting (LL), Soil samples (SS) and Winkler Bags (WB) were applied for ant collection bimontly from June 2005 – January 2006. The results showed 135 species that belong to 35 genera under 6 subfamilies: Cerapachyinae, Dolichoderinae, Formicinae, Myrmicinae, Ponerinae and Pseudomyrmecinae. The subfamily Myrmicinae had the highest number of species and the genus *Pheidole* had the highest proportion of species.

การสำรวจผีเสื้อหนอนม้วนใบวงศ์ย่อย *Olethreutinae* ในอุทยานแห่งชาติเขานัน  
จังหวัดนครศรีธรรมราช

**Survey of *Olethreutinae* (Lepidoptera: Tortricidae) in Khao Nan National Park  
Nakhon Si Thammarat Province**

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Olethreutine moth is one of the largest group among microlepidoptera, small to medium in size 0.6-5.0 cm, that widely distributed in agricultural and forest area. The diversity study of *Olethreutinae* in Khao Nan National Park is started from May, 2006 until August, 2006, 20 nights totally. Collecting sites were selected in different areas belonging to the Khao Nan National Park Protection Units. Blacklight was used for olethreutine moths attractive that operated with 12-volt car battery. One hundred and fifty specimens of olethreutine moth were found, of which 65 morphospecies were identified initially. Of those will be identified precisely, including published new record or new species.



ความหลากหลายทางชีวภาพของผีเสื้อกลางวันในอุทยานแห่งชาติเขานัน  
จังหวัดนครศรีธรรมราช

**Biodiversity of butterfly fauna in Khao Nan National Park,  
Nakhon Si Thammarat Province**

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This investigation of the biodiversity of the butterfly fauna in Khao Nan National Park, Nakhonsritammarat Province, upper Peninsular Thailand, was conducted in order to gain preliminary knowledge on the species diversity, local distribution, abundance status and some relevant ecological data of the butterfly fauna dwelling in the southern rain forest ecosystem, which comprising lowland up to the hilly regions, emphasizing on the cloud forest sub-ecosystem, including those affected by human activities. Two collecting techniques had been employed, i.e. the thorough searching along the selected survey lines of 1000 m. long and 10 m. wide, between 8 a.m. to 5 p.m.; and line trapping at 6 points each along the same survey lines. Species identification was done by using key for identifying butterfly species of the Malay Peninsular in particular and of Thailand in general; together with the comparison to the labeled specimens deposited in many insect collections. The initial result of the 2 previously-conducted surveys revealed as 151 butterfly species in 5 families, i.e. the Papilionidae, Pieridae, Nymphalidae, Lycaenidae and Hesperidae. The majority are the southern subspecies of the known Thai fauna. Rare and uncommon species include *Neorina lowii*, *Enispe intermedia*, *Tanaecia jahnu*, *Prothae franck*, *Heliophorus epicles* and *Choaspes subsavdatus*. Only one legally protected butterfly species, *Troides amphrysus*, was found in this study area.

คุณภาพน้ำและชนิดของปลาน้ำจืดที่พบบริเวณน้ำตกคลองผด น้ำตกคลองปาวและ  
น้ำตกกรุงนาง อุทยานแห่งชาติเขานัน จังหวัดนครศรีธรรมราช

**Water quality and freshwater fishes of Klongpod, Klongpaw and Kungnang  
Waterfalls, Khao Nan National Park, Nakhon Si Thammarat Province**

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This study examined water quality and freshwater fish diversity at Klongpod, Klongpaw and Kungnang Waterfalls, Khao Nan National Park, Nakhonsithammarat Province. We collected water samples and fish species from 3 stations at each waterfall with 3 replications per station. The average of water quality measurements from 3 waterfalls were as follows: alkalinity 46.48 mg/l, hardness 48.33 mg/l, water temperature 25.85 °C, air temperature 27.88 °C, pH 7.52, nitrite and nitrate 0.01 mg/l, ammonia 0.09 mg/l, acidity 3.62 mg/l and dissolved oxygen 8.2 mg/l. Water quality from these waterfalls was in good condition. Eleven fish species were found from 3 waterfalls: Soro brook carp (*Neolissochilus soroides*), Soro brook carp (*Tor tambroides*), two species of Blue danio (*Danio regina* and *D. aequipinnatus*), Silver rasbora (*Rasbora argyrotaenia*), T-barb (*Puntius lateristriga*), Horse-face loach (*Actinopterygii* sp.), Round-tail garfish (*Xenantodon cancella*), *Garra taeniata*, Sumatran tiger barb (*Puntius partipentazona*) and Barb (*Puntius binotatus*).

ลักษณะความผันแปรทางสัณฐานวิทยาของปลาพลวง (*Tor tambroides*)

บริเวณอุทยานแห่งชาติเขานัน จังหวัด นครศรีธรรมราช

## Morphological variation of *Tor tambroides* at Khao Nan National Park, Nakhon Si Thammarat Province

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The Greater Brook Carp (*Tor tambroides*) is in the family Cyprinidae and typically inhabits waterfalls in Thailand. This fish has a long large flat torso with green brown colors, small head, and large scales and is 15-20 cm in body length. Khao Nan National Park, Nakhon Si Thammarat Province is composed of a large tropical rainforest, wildlife habitats and many waterfalls. This study aims to examine the homogeneity of populations and the variability of morphometrics of the Greater Brook Carp between waterfalls within National Park. At each waterfall, the Greater Brook Carp will be collected from three elevations with three replicates per elevation and 50 Greater Brook Carp males and 50 females collected per replicate. Both meristic (e.g. the number of scales, and the number of spines) and morphometric characteristics (e.g. standard length, forked length, snout length, eye length, head length and depth) will be measured. The data will be analysed by using the Truss network method to discriminate physically-similar fish populations and using multivariate analyses (i.e. Discriminant Analysis, Cluster Analysis, and Factor Analysis) for separating different fish populations. Data on morphometric measurements have often been analysed to determine differences between fish populations. Once we have a better understanding of the morphometrics of the Greater Brook Carp, we can determine the number of Greater Brook Carp populations at Khao Nan National Park. This will lead to better ways of sustainable conservation and national park management.

การศึกษาความหลากหลายของสัตว์เลื้อยคลานและสัตว์สะเทินน้ำสะเทินบก  
ในอุทยานแห่งชาติเขานัน จังหวัดนครศรีธรรมราช

**Diversity study on reptiles and amphibians in Khao Nan National Park,  
Nakhon Si Thammarat Province**

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A diversity study on reptiles and amphibians in Khao Nan National Park is in the frame of thinking and research direction of the Khao Luang Project, part 1: a study of Khao Nan Cloud Forest. This joint project was funded by BRT between January and December in 2006. The expected objectives comprise taxonomic and ecological investigation of target fauna which might be used as the indicator of the ecosystem richness. Data collection will be focused on species richness, abundance and status of these animal groups in variable microhabitats and altitudes using suitable methodologies such as general collecting, stream and forest transects, 5x5 m plot samplings and pit-fall trapping which are related to their distribution and secretive niches. The output of this project will be used for the preparation of sustainable biological resources management plans between the national park and the local people communities.

การเตรียมข้อมูลด้านบรรยากาศสำหรับการพัฒนาแบบจำลองศักยภาพ  
การกระจายตัวของสิ่งมีชีวิต ณ อุทยานแห่งชาติเขานัน

**Preparation of atmosphere data for potential distribution modelling,  
Khao Nan National Park**

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This study aims to model potential distribution and niche characterisation using Geographical Information Systems (GIS) tools at Khao Nan National Park. This study will incorporate the power of GIS with multivariate statistical tools to formalise the link between the species and their habitats, in particular to quantify the parameters of habitat-suitability models. This work is divided into two parts: field and ecological modelling works. Field works include collecting biological and physiological data in the field. Both data will be collected in GIS format. The species richness and species diversity of selected species assemblages will be related with topography, atmosphere, hydrology, land cover and soil composition. Since there are large quantitative data, the database system will be used in this study for collecting the data. Then the biological and physiological data will be employed in the ecological modelling that has been developed. Eight atmospheric stations were established at Khao Nan National Park Head office and 7 Khao Nan National Park stations. All atmospheric data were collected daily by trained national park rangers using Atmosphere GLOBE protocol including cloud type, cloud cover, relative humidity (RH), the amount of rainfall, solar noon air temperature, and maximum and minimum air temperature. There are 240 atmosphere data recorded in April and May 2006. There were the averages of 25 - 50% cloud cover, 71% RH, the daily rainfall 8.1 mm, solar noon temperature 31.1 °C, maximum temperature 32.6 °C, and minimum temperature 22.2 °C.

## ระบบฐานข้อมูลความหลากหลายทางชีวภาพ NBIDS

### **NBIDS : Biodiversity Database Information System**

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NBIDS biodiversity database system is designed to be a prototype for a general biodiversity database system that provides services to various user groups. The target user groups include public use, researchers, to administrators for decision making. The designed services are database queries and searching, entering and editing services, mapping and graphing, and advanced computational models e.g. various biological indices for managements and monitoring. Moreover, the system will provide physical and environmental data such as soil, hydrology, atmosphere data and data from various satellites for uses with biological data and for ecological models buildings.