

ชนิดและการแพร่กระจายของลูกปลาวัยอ่อนบริเวณปากแม่น้ำแม่กลอง จังหวัดสมุทรสงคราม

Species composition and distribution of fish larvae at Maeklong Estuary, Samut Songkram Province

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Species composition and distribution of fish larvae at Maeklong Estuary, Samut Songkram Province were studied in July 2004 to June 2005. Nine sampling station were operated every months, The total of 41,180 fish larvae were found. The results showed that the fish larvae composed of 19 families in the study area which were consisted of 10 economic families. The highest and most distribution of fish larvae is Gobiidae. The next highest of fish larvae is Clupeidae Ambassidae Blenniidae and Engraulidae. Highest density of fish larvae was found in January 2005 with a density of 125,770 larvae/ 1,000 m³ of seawater, while the lowest abundance of fish larvae was recorded in September 2005 with a density of 2,616 larvae/ 1,000 m³ of seawater

ขนาดหูด ความชอบของปลากริมเพศเมีย และการต่อสู้ของปลากริมเพศผู้

Bubble nest size, female preference and male-male competition in croaking gourami (*Trichopsis vittata*)

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This study examined how bubble nests affected female preference and male-male competition in croaking gourami (*Trichopsis vittata* Cuvier, 1831). We divided our study into three treatments: (1) two-bubble-nest treatment, (2) one-bubble-nest treatment and (3) no-bubble-nest treatment. We found that females preferred small bubble nest males over large ones and preferred males with no bubble nest over males with bubble nests. Comparing female preferences among the three treatments, females spent more time with males in the no-bubble-nest treatment than in the two-bubble-nest treatment. Large bubble nest males and males with bubble nests did not win more fights than either small bubble nest males or males without bubble nests respectively. Large bubble nest males performed more chasing and less escaping behaviour than small bubble nest males. There were no differences in the total antagonistic behaviour and each antagonistic behaviour between males with and without bubble nests. Males from the two-bubble-nest treatment performed the highest number of surfacing behaviour and males from no-bubble-nest treatment displayed the highest amount of biting behaviour. Winners in all treatments performed a higher number of adherence and chasing behaviour than losers. There was no significant difference in fighting duration between the three treatments.

การแปรผันและการแพร่กระจายของปรอทในเนื้อเยื่อสัตว์น้ำที่จับจากทะเลสาบสงขลา

Variation and distribution of mercury in the tissues of aquatic organisms catching from Songkhla Lake

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Songkhla Lake (SKL) is a largest semi-enclosed lagoon system in Southeast Asia. The lake is economical important to fisheries, both natural and artisan. It receives water, combining agricultural sector and new industrial settlement, from its surrounding watershed. The changing of landuse and landcover may lead to higher discharge of polluted water to the water body. Contamination of mercury (Hg) in fishery resources causes a toxicity risk to consumers via food chain. In this study 47 species of fishes (3 herbivores, 10 omnivores and 34 carnivores) and 8 species of shrimp were collected (from local piers, markets and fishermen around SKL). The samples were collected from 6 surveys during August 2004 to July 2005. Edible tissues of 218 samples were analyzed for Hg using cold vapor atomic absorption spectrometry. Average (range) concentration of Hg in carnivorous fish, omnivorous fish, herbivorous fish and shrimp were 0.095 ± 0.108 (0.011-0.625), 0.036 ± 0.022 (0.012-0.033), 0.033 ± 0.032 (0.012-0.070) and 0.015 ± 0.007 (0.007-0.026) mg/kg wet weight, respectively. It was found that Hg contents in tissues of most aquatic organisms in SKL did not yet exceed the maximum residue limit as recommended by WHO and Ministry of Public Health of Thailand (0.5 mg/kg wet weight). Only one specimen, archerfish (*Toxotes chatareus*), contained Hg at 0.625 mg/kg wet weight. The results provide information to be used to calculate a safety factor for consuming fisheries resources from SKL, and are basic information to develop an environmental management guideline for controlling of Hg contamination in SKL region.

สัณฐานวิทยาผลึกแก้วหูของปลาจากชายฝั่งทะเลตอนใต้ของไทย

Otolith morphology of fishes from the Southern Coasts of Thailand

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Fish specimens were collected from June 2002 to May 2003 from fishing piers and markets along the southern coasts of Thailand. Taxonomic classification was classified according to Bone, Marshall and Blaxter, (1995). The sagittal otoliths were removed from the skull of the fish. Length and height of each otolith was measured. The morphology of each otolith was studied and imaged by scanning electron microscope. Terminology for each part of an otolith was according to Smale, Wastson and Hecht, (1995). The sagittal otoliths of 211 fish species, 2 sub-families 60 families, and 14 orders from the southern coasts of Thailand show distinctive morphology, which is species-specific, i.e. for shape, sulcus acusticus, ostium, cauda, rostrum and antirostrum. Other morphological features of sagittal otoliths, such as dorsal depression, ventral depression, crista superior, crista inferior are also species-specific. The shape displays 17 types, whereas the sulcus acusticus shows 4 types and the sulcus opening manifests 4 characters. The margin sculpturing of these otoliths have 8 characters. However, the otolith sizes are less correlated to taxonomic groups and more correlated to habitat, which shows 5 habitats: pelagic, bottom, demersal, bathypelagic, benthopelagic. The distinctive morphology and size of the sagittal otoliths of each species are due to many factors. The main factor is the environmental and biological mechanisms that the fish live in. This research represents a pioneer study designed to investigate shapes and sizes of fish otoliths from coastal Thailand. The results of this research will be useful for future study of the fish biology of Thailand.

ความหลากหลายและการแพร่กระจายตามระดับความสูงของสัตว์สะเทินน้ำสะเทินบกบริเวณ
ลำห้วยลำตะคองในอุทยานแห่งชาติเขาใหญ่

**Species diversity and altitudinal distribution of amphibians along Lam Ta Klong
Watered Area in Khao Yai National Park**

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This species diversity was carried out at 7 elevations along Lam Ta Klong stream in Khao Yai National Park at 400, 500, 600, 700, 800, 900, 1,000 MSL. It revealed that 17 amphibian species classified in 1 order, 5 families and 10 genera. The comparison of individuals, species numbers and diversity indices at all elevations. It was found that the 700 MSL site had the highest individuals, the 400 MSL site the highest species numbers and the 1,000 MSL site the highest diversity index. The statistical analyses of individuals, species numbers and diversity indices of amphibian against the seasons, revealed that the individual numbers and species numbers of amphibian in dry season significantly differing from those of wet season at 0.01; while the diversity index was non significant. Dealing with the relationship between amphibians and environmental factors, it was found that the individuals showed positive relationship to monthly average precipitations, monthly average temperatures and the relative humidities at 0.01, species numbers showed positive relationship to monthly average precipitations and monthly average temperatures at 0.01, but negative relationship to the relative humidities. The diversity indices showed negative relationship to monthly average precipitations, monthly average temperatures and the relative humidities.

วงศานวิวัฒนาการของกะท่างน้ำในประเทศไทย โดยใช้ลำดับเบสของไมโทคอนเดรียลดีเอ็นเอ

Phylogenetic relationships of Thai Newts assessed by mitochondrial DNA sequences

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Newts (Genus *Tylostotriton*) as are classified amphibians in the Order Caudata (Urodela); Family Salamandridae; Genus *Tylostotriton*. *Tylostotriton verrucosus* is the only species known from Thailand. Its distribution is in Northern mountain ranges and Northeastern mountain ranges with the elevation of their locations are over 1,000 m. above mean sea level. Their habitats are the mountain pools or hill stream with shade of plants above the pools and litter at the bottom of the pools. Porrawee Pomchote (2004) found that newts in Thailand may be divided into 2 types based on difference in morphometry, body colouration and distribution. Type I (orange to yellow body colouration) distributes in Northern mountain ranges, while Type II (dull body colouration) distributes in Northeastern mountain ranges. It is thus possible that newt population in Thailand may comprise of more than one species. In order to compare difference between populations of newt in Thailand, molecular biology techniques and bone morphology should be studied. We thus propose this research project to gain molecular basis of genetic difference and construct a phylogenetic relationship between populations. These data could be useful for further taxonomic evaluation and conservation of this animal in the future.

การประเมินวิวัฒนาการของความหลากหลายของเต่าในกลุ่ม Testudinoid ในสมัยโอลิโกซีน
และนีโอจีนของประเทศไทย

**Appraisal of the evolution of Testudinoid turtles diversity from the Oligocene and
Neogene of Thailand**

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The main purposes of the present study were to prepare a comparative catalogue of osteology of living testudinoid turtles in Thailand and to review turtle diversity from the Oligocene and Neogene in Thailand, which are poorly reported in literature. The catalogue consists of shell, skull, humerus, femur, girdle and pelvic girdle. It will be a tool for studying comparative anatomy of living and fossil turtles. The resulting keys will be useful and convenient for identification of living testudinoid turtles in Thailand. Comparison of fossil specimens with the catalogue indicated that they are not living ones. Some fossils are related to species in Southeast Asia. Therefore, it will provide important data about the evolutionary relationships of the Southeast Asian turtle, and the origin of turtle diversity in this group. It will also provide the patterns of extinction, migration, and endemism that occurred in the history of fossil testudinoid turtles since the Oligocene. The identification, systematics, phylogeny and palaeobiogeography of fossil turtles are still in the process of study.

ความหลากหลายทางชีวภาพของนกที่อุทยานแห่งชาติทุ่งแสลงหลวง จังหวัดเพชรบูรณ์

Biodiversity of birds at Tung Salang Luang, National Park, Phetchabun Province

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A survey of birds diversity was carried out at Tung Salang Luang National Park in three habitats type; dry evergreen forest, dry dipterocarp forest and ecotone forest (dry evergreen forest mixed with dry dipterocarp) during the period of March 2004 to February 2005 was a part of Biodiversity of Birds at Tung Salang Luang, National Park, Phetchabun Province research. The surveys revealed 6,696 birds in 142 species 34 family 11 order occurring in dry evergreen forest, dry dipterocarp forest and ecotone forest were as follows: 100 species, 103 species and 107 species respectively. The dominant species in dry evergreen forest were Black-crested Bulbul (*Pycnonotus melanicterus*), Puff-throated Bulbul (*Criniger pallidus*) and Grey-eyed Bulbul (*Hypsipetes propinquus*). In dipterocarp forest, Rufescent Prinia (*Prinia rufescens*), Sooty-headed Bulbul (*Pycnonotus aurigaster*) and Hill Myna (*Gracula religiosa*) were dominant species. Whereas, in ecotone forest, Grey-eyed Bulbul (*Hypsipetes propinquus*), Puff-throated Bulbul (*Criniger pallidus*) Black-crested Bulbul (*Pycnonotus melanicterus*) and Hill Myna (*Gracula religiosa*) were dominant species. The similarity index was used to investigate the similarity of bird species between forest types (Montford,1962). It was found that, ecotone forest and dry evergreen forest was similar more than ecotone forest and dry dipterocarp forest. Ecotone forest gave the highest the Shannon diversity index, followed by dry dipterocarp and dry evergreen forest, respectively. The interesting that, two species of bird were found in this area. The first, Jerdon' Baza (*Aviceda jerdoni*) was the winter visitor with few record. The second, Javan Cuckooshrike (*Coracina javensis*) was the resident with few record and it was found in Hala-Bala Wildlife Sanctuary, the south of Thailand.

ลักษณะสภาพภูมิประเทศของอ่าวไทยตอนในที่มีผลต่อความหลากหลาย
และจำนวนของนกชายเลน

**Effects of landscape characteristics on diversity and abundance of migratory
shorebirds in the Inner Gulf of Thailand**

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The objectives of this study are to characterize landscape characteristics of migratory shorebird stopover sites in the Inner Gulf of Thailand and to investigate the effects of landscape characteristics on diversity and abundance of migratory shorebirds using the area. The project will be conducted during 2 migration seasons between years 2006-2007. The study areas are coastal shorebird habitats along the Inner Gulf of Thailand, 1 km radius of 38 sample points will be placed systematically along the study area. Two major methods will be applied; first, a combination of GIS techniques will be used to extract thematic data from high resolution satellite images to delineate habitat configurations and analyze the landscape metrics in each sample point using program FRAGSTATS. Second, simple count of birds will be conducted in every sample point in southward migration season (Aug. 06 - Oct. 06) and northward migration season (Feb. 07 - Apr. 07). The relationship between the abundance and diversity of the birds and landscape metrics will be examined using stepwise multiple regressions, as well as suitable shorebird habitat can be predicted by modeling from GIS technique. The benefits of this study will be to provide an overview of shorebird habitat characteristics in the Inner Gulf of Thailand and the relationship between shorebird numbers and diversity which can be used as a baseline for future studies, conservation plans, and land-use management both at the national and the international level. Furthermore, it will lend scientific support for developing legal protection, and facilitate in raising public awareness of the most distinctive wetland and most important site for shorebirds in the entire country.

การสำรวจสถานภาพสัตว์เสี่ยงสูญพันธุ์เฉพาะถิ่นของไทยที่อาศัยอยู่นอกพื้นที่อนุรักษ์
ในเขตที่ราบภาคกลางของไทย

**Intensive survey of the current status of Thai endemic mammals and their
habitats outside the protected areas in Central Thailand**

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Three species of Thai endemic mammals, the Thailand roundleaf bat (*Hipposideros halophyllus*: Rhinolophidae), the limestone rat (*Niviventer hinpoon*: Muridae), and the Neill's rat (*Leopoldamys neilli*: Muridae), have not been reported in their own type localities for at least 31 years since their first discoveries. The type localities are now being continuously disturbed by human activities, which can be strongly resulted in driving them to the brink of extinction. Intensive surveys were conducted to uncover the present existences of these endemic mammals in 7 areas using live trapping and mistnetting techniques. The results reveal the existences of three endemic mammals. The Thailand roundleaf bats, an insectivorous species, were found in two areas; the Khao Samorkhon, Amphoe Tha Wung, Changwat Lop Buri (14°54'38" N, 100°30'02" E) – its type locality, and the Khao Singto, Amphoe Muang district, Changwat Sa Kaeo (13°54'34" N, 102°03'46" E). The limestone rat was encountered in 2 areas, the Khao Dondung, Amphoe Ban Mi, Changwat Lop Buri (15°08'35" N 100°36'44" E), which was the first record of its occurrence outside the known distributional range, and the Wat Tham Prathat, Amphoe Muang, Changwat Lop Buri (14°48'15" N 100°49'30" E). The Neill's rat was found living at the Wat Tham Prabhothisat, Amphoe Kaenhkoi, Changwat Sara Buri (14°34'31" N 101°08'43" E), its type locality which is the same place as that of the limestone rat. The results indicated that all endemic mammals are very extremely low numbers of populations and very restricted distributional ranges.

ความสัมพันธ์เชิงวิวัฒนาการของสัตว์วงศ์กวางในประเทศไทย

Molecular phylogenetic relationships among the Cervidae in Thailand

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The study of molecular phylogenetic relationships among the Cervidae in Thailand will be determined by mitochondrial DNA sequences of cytochrome *b*, control region and 16S rRNA genes from 5 cervid species in Thailand, namely Barking deer (*Muntiacus muntjak*), Fea's muntjac (*Muntiacus feae*), Sambar deer (*Cervus unicolor*), Eld's deer (*Cervus porcinus*) with the aim to study the genetic diversity and phylogenetic relationships among deer in Thailand. Tissue and hair samples (10-25 samples per species) will be collected from wildlife research stations under the responsibility of the National Park, Wildlife and Plant Conservation Department. Molecular marker genes will be amplified by polymerase chain reaction (PCR). PCR products will be purified using QIAquick PCR purification Kit, bidirectionally sequenced and analysed on an ABI 377 automated DNA sequencer. From the sequence data, three types of phylogenetic tree, i.e., neighbour-joining (NJ), maximum parsimony (MP) and maximum-likelihood (ML) will be constructed to investigate evolutionary relationships among deer. Haplotype and nucleotide diversity will be calculated for assessing the distribution of genetic variation within and between populations. These molecular study will provide genetic diversity and phylogenetic information about Thailand's cervids and will give some insight into strategies for deer genetic conservation especially for vulnerable species both of extant captive stocks and wild populations in Thailand.

บทบาทของชะนีต่อการฟื้นตัวของป่า จากการศึกษาการกระจายเมล็ดและการเกิดใหม่ของ
เงาะป่า *Nephelium melliferum* Gagnep. (Sapindaceae) ในแปลงศึกษาความหลากหลาย
ทางชีวภาพมอสิงโต อุทยานแห่งชาติเขาใหญ่

**The role of gibbons in forest regeneration: seed dispersal and regeneration of
Nephelium melliferum Gagnep. (Sapindaceae) on the Mo Singto Plot,
Khao Yai National Park**

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The Mo Singto Forest Dynamics Plot in Khao Yai Park, with its trees individually mapped and identified, is an ideal site for the study of the effects of gibbon foraging and seed dispersal on tree recruitment. Current studies focus on the effects on individual species consumed by gibbons as well as on the entire forest community. The fruiting tree *Nephelium melliferum* (Sapindaceae) is consumed by a variety of mammals but gibbons are the only dispersers that carry seeds far from the parent trees. Fruit consumption and seed fate were studied by sampling fruit-fall under the tree and by direct observation of frugivores in the trees. Squirrels dropped about 55% of the seeds of ripe fruit unharmed under the tree and pig-tailed macaques picked about 9% of the fruit, dropping most of it under the tree, whereas gibbons consumed about 20% of the fruits, swallowing the seeds. Gibbons disperse *Nephelium* seeds over virtually the entire home range, which occupies about $\frac{3}{4}$ of the plot. Nevertheless, examination of the distribution of *Nephelium* trees in the tree census indicates that while large trees (>10 cm in diameter) are distributed over the whole plot, smaller trees (1–9.9 cm) are mostly restricted to east and north-facing slopes. This suggests that very recent climate change may be restricting recruitment of the species to relatively moist areas. Further research is needed to test this idea.

การประเมินมูลค่าทางเศรษฐศาสตร์ในการอนุรักษ์และการจัดการช้างป่าในประเทศไทย

Economic valuation for conservation and management of wild elephants in Thailand

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This study aimed to investigate the opinion and awareness of Thai people regarding wild elephant conservation and management and to assess the benefits of conservation and management of this species to Thailand. The study employs a “choice modeling” method to estimate the willingness to pay for wild elephant conservation of people living in urban areas of Thailand and to examine the optimal management level. Findings from the study will provide information on the awareness and concern of urban people towards wild elephant conservation and management, the benefits of conservation estimated from the willingness to pay and the factors affecting willingness to pay, optimal management alternatives, direct expenses related to the species’ conservation and management, as well as damage values from wild elephants encroaching on rural agricultural areas. This information is significant for the concerned agencies in designing policy measures related to conservation and management of wild elephants in order to help protect these species from extinction in Thailand.