

## A Role of the Great Hornbill ( *Bucerosbicornis*) in its Food Plant Dispersal in Khao Yai National Park,Thailand.

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A role of the great hornbill (*Buceros bicornis*) as a dispersal agent for seeds of food plants was studied by field observation during 28<sup>th</sup> July to 5<sup>th</sup> December 2000 in Khao Yai National Park, northeast,Thailand. The nest tree and non-nest tree of Yang Sian (*Dipterocarpus gracillis* Bl.) in the same community of the tropical rain forest were selected for study. Quantities and species distribution of seedlings and saplings of food plants in plots surrounding of the nest tree and non-nest trees were recorded. Twelve species of food plants were found under the nest tree while only 6 species were under the non-nest tree .The percentage of seedlings/saplings of each species found under the nest tree was as followed:Suraamarit (*Cinnamomum subavenium*) 86.26%,it was the highest number,Taa Suea Bai Yai (*Dysoxylum* sp.) 2.84%,Luead (*Knema* sp.),Ma Duea Bai Khon(*Ficus* sp.) and Nam Thao Noi (*Cyathostemma micranthum*) 1.90% each ,Yaang Don (*Polyalthia viridis*) 1.42 %,Thang Ghan Shun(*Litsea* sp. ) and Khang Khok (*Phoebe* sp.) 0.95% each and Taa Suea Saai(*Aphanamixis cucullata*) Yaang Bon(*Phoebe grandis*) Yaan Nom Kwai (*Uvaria grandifera*) and Taam Sao (*Wallichiana engler*) 0.47% each. The randomized distribution of the food tree species from the nest tree indicated that the male great hornbill played the most important role as a seed disperser than the female one.

**Key word** : Great Hornbill ( *Bucerosbicornis*)

**Analysis cadmium chromium copper and lead in fish from oxidation pond of Srinacarin Hospital of Khon Kaen University.**

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Cadmium, chromium, copper and lead levels in 3 fish species, i.e., common silver barb (Barbodes gonionotus (Bleeker,1850)), common climbing perch (Anabus testudineus (Bloch,1792)) and three-spot gourami (Trichogaster trichopterus (Pallas,1770)) from Khon Kaen University oxidation pond were investigated. The fish samples were dried and digested into solution for further analysis. The results showed that chromium levels were undetectable due to analytical disturbance. Cadmium and copper levels in the 3 fish species increased in chronological order while lead levels did not show that tendency. The highest levels of cadmium, chromium and lead in the 3 fish species during the studied period were found to be  $<0.099$   $-1.380\pm 0.082$  mg/kg ,  $0.577\pm 0.002$  —  $2.145\pm 0.668$  mg/kg and  $5.001\pm 0.006$  —  $7.541\pm 0.027$  mg/kg , respectively. The three heavy metal levels were in accordance with the level allowed for consumption.

**Key word** : Analysis cadmium, oxidation pond

## **Solid Waste Management in Large Size Offices Phase 1: Faculty of Medicine, Khon Kaen University.**

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The objective of this study is to improve the solid waste management in Faculty of Medicine, Khon Kaen University. The data was collected during at September to October 2007. Solid waste was collected from each department office and the office of dean and was analyzed for quantity and some quality properties. The cleaners were interviewed for understanding the management process.

The results showed that the majority of department offices were not separated of solid waste. The amount of solid waste generated was 53.24 kg/day and the generation rate was 0.23 kg/person/day. Type of solid waste were decomposable waste (25.75%), recycle waste (57.88%), residual waste (16.34%) and hazardous waste (0%). Separation at source was conducted only in the 8 department offices in the hospital building. Solid waste from the 12 department offices in the pre-clinic building and the office of dean were not separated.

As the result of survey study and analyzing data of solid waste and physical appearance from faculty of medicine offices , the proposed method was auction, which is partly operated in the hospital building, because of low cost and high benefit.

Approximately 6,210 baht/month and reducing of 29.94 kg solid waste per day were estimated using the additional solid waste from 12 department offices and the dean office.

**Key word** : Solid Waste Management



## Studies of Natural Dyes in Tinting Recycled Paper.

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The study of natural dyes in tinting recycled paper using five types of natural dyes hydrophilic extracted from five species of plant; *Curcuma longa* Linn, *Oroxylum indicum* (Linn) Vent, *Caesalpinia sappan* Linn, *Clitoria ternatea* Linn and *Pterocarpus macrocarpus* Kurz. Three kinds of recycled paper tinted made were from photocopied paper, newspaper and combination between photocopied paper and newspaper with a ratio 1:1 by weight. The method of dyeing used in the study was direct dye. The results showed that the best natural dyes to tint the recycled paper were *Caesalpinia sappan* Linn and *Pterocarpus macrocarpus* Kurz, the second best natural dye was *Clitoria ternatea* Linn, and the worst natural dyes were *Curcuma longa* Linn and *Oroxylum indicum* (Linn) Vent. When different kinds of the recycled paper were tinted with each type of the dyes at different concentration, they turned out in different colors. However at the initial concentration of *Clitoria ternatea* Linn, they turned out in the same color. The recycled paper from the combination and newspaper turned out in the same color when tinted by *Caesalpinia sappan* Linn. Moreover the recycled paper from photocopied paper and newspaper gave the same color when tinted by *Pterocarpus macrocarpus* Kurz . When dyed by different concentration of each types of the natural dyes, they got different color. In addition, study on color absorption on paper was investigation using-visible. The results showed that the UV absorbent values were varies. Therefore this method

not suitable for study on color absorption on paper. However, if the pH of the extracted dye was controlled, this technique might be suitable.

**Key word** : Natural Dyes, Tinting Recycled Paper

## Study of Available Nitrogen, Available Phosphorus, Available Potassium and Some Physical Factors in a Disturbed Soil Area by Rice Straw Burning.

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The study of available nitrogen, available phosphorus, available potassium and some physical factors, including soil moisture, soil bulk density, temperature and pH in a disturbed soil area by rice straw burning. It was done in a experimental field of faculty of agriculture, Khon Kaen University. The experiment was divided into two treatments. The first treatment was controlled, the **second** treatment was burned by 2.4 kilograms of rice strew on an area of 4 square metre. The soil **samples** were collected every three days for the first , four times and every week for next five times.

The result showed that changing in available nitrogen, available potassium, percentage of **moisture**, soil bulk density, temperature and pH were significantly different ( $p < 0.05$ ). While the available phosphorus were not significantly different. Moreover, It can be concluded that changing in available nitrogen, available phosphorus, available potassium, percentage of moisture and temperature is effected by rice straw burning. While the soil density and pH were not effected by rice s:raw burning. However, the fact from burning rice straw in the experiment uncomparable to that in paddy field.

**Key word** : Available Nitrogen, Available Phosphorus, Available Potassium

## Study of Microbial biomass and Cation exchange capacity in a Disturbed Soil Area by Rice Straw Burning.

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Study the change of the microbial biomass and cation exchange capacity (CEC) in a disturbed soil area by rice straw burning  $0.6 \text{ kg/m}^2$  on 3 quadrants. The microbial biomass (chloroform fumigation extraction ;CFE) and CEC (ammonium acetate) were determined every 3 days for 12 days and then every week after that until 33 days.

The results showed that the microbial biomass in controlled soils were not significantly different ( $p > 0.05$ ). **But** the microbial biomass in burned soils with rice straw was significantly different ( $p < 0.05$ ) because the temperature higher might affect the microbial population. Afterward that soil microbial biomass was significantly increased within 26 days.

The result indicated that cation exchange capacity (CEC) throughout 33 days was rather proximity. The CEC in burned soil with rice straw could not be measured because the chemical compound or cation in soil wasn't changed. It is still at  $< 3 \text{ meq/100g}$ .

**Key word** : Microbial biomass, Disturbed Soil Area

## Study of Phytoplankton in Oxidation ponds and provide information through Information Technology System.

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Studies of Phytoplankton in Oxidation ponds, Srinakarin Hospital Wastewater Treatment Plant, Khon Kaen University and provision of information through Internet, were investigated. The phytoplankton samples were collected during October to November 2000. The total number of Phytoplankton were followed; 16 genera 26 species of the Chlorophyta, 4 genera 7 species of Euglenophyta, 3 genera 3 species of Cyanophyta, 2 genera 2 species of Chrysophyta and 1 species were unidentified. The most of genera was *Scenedesmus* (6 species) followed by *Tetraedron* and *Phacus*. Three species were not found in Siripom (1999) which were *Micractinium pusillum* Fresenius, *Tetraedron trigonum* (Naegeli) Hansg. and *Tetraedron* sp. Information provided through the Internet at "[http://www.geocities.com/plankton\\_chain/](http://www.geocities.com/plankton_chain/) or <http://www1.7host.com/phytoplankton/>" including the method of the study , the results , the conclusion and suggestion.

**Key word** : Phytoplankton in Oxidation ponds



## **The Quality of Cube Ice in Plastic Buggage at Khon kaen Municipality.**

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The study of the quality of cube ice in plastic baggage at Khon Kaen municipality. This project was study in three dimension, 1.) physical characteristic 2.) chemical characteristic 3.) biological characteristic of cube ice. The result shew that 1.) physical characteristic of cube ice had a standard in turbidity accept pH from 83.33% of samples. 2.) chemical characteristic in the cube ice such as total solids, iron, chloride, fluoride, nitrate, and total hardness of all the samples had a standard. 3.) biological characteristic in term of standard plate count (91.67% of samples), total coliform bacteria (100% of samples), and fecal coliform bacteria (100% of samples) had not in the standard criteria.

**Key word** : Quality of Cube Ice, Plastic Buggage

## **The Effect of Liquid Biofertilizer Concentrations on Soil Microbial Activity.**

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The research was conducted to study the effect of liquid biofertilizer concentrations on soil microbial respiration rate as their activities. The liquid biofertilizer from Theparuk's liquid biofertilizer was applied once at the beginning of the experiment. The rate of CO<sub>2</sub>-C from soil microbial activity was higher in the order : 0.500, 0.125, control and 0.250 %. The highest respiration rate in 0.500% was 322.54 µg C/g soil (CO<sub>2</sub> average production was 10.52 µg C/g soil-day) and the activities increased between 3 to 21 day. Comparison of the group of microorganisms, the CO<sub>2</sub> production rate from bacteria was higher than from fungi. The highest respiration rate emission at 0.500 % was 174.86 µg C/g soil (CO<sub>2</sub> average production was 5.59 µg C/g soil-day) and the activities increased between 7 to 21 day. Fungi. the highest respiration rate emission at 0.125 % was 162.74 µg C/g soil (CO<sub>2</sub> average production was 5.10 µg C/g soil-day) and the activities increased between 7 to 21 day.

**Key word** : Liquid Biofertilizer, Soil Microbial

## **The feasibility study of bicycle use of student in Khon Kean University for energy saving.**

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Khon Kean university bike use feasibility has been done for energy conservation, data collection of vehicle used , vision and possibility of bicycle preference in Hon Kean campus by 700 questionare among students.

The result found that majority of students have their own vehicle ( 72.3%, Table 1) as motorcycle 65.9 % , motorcar 4.7 % and foot bike 4.1%. Good vision trend of bicycle use among the motorcycle and foot bike own students but less possibility in the motorcar own students . Most students agree with the idea that using footbike will help in reducing air pollution and is a sound exercise but lost and safety scene to be around trouble in rainy season. The cost of gasoline and maintenance expense of bicycle showed less than motorcar and motorcycle in 77 % and 68% respectively.

**Key word** : bicycle, energy saving

## Utilization of Treated Wastewater from Constructed Wetlands for Ornamental-fish Culture.

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Ornamental-fish Culture in water from Constructed Wetlands receiving wastewater from Sc.07 building, Khonkaen University, was carried out. The two fish culture were *Xiphophorus helleri* Heckel and *Poecilia leticulata* Peters and the water-quality parameter studied were temperature,SS,DO,free  $CO_2$  and pH. The results of the study showed that the water quality both before and during the fish culture were approximately the same. During the fish culture, temperature and free  $CO_2$  values met the standard level for living organisms with temperature range of  $23-32\text{ }^{\circ}\text{C}$  , and free  $CO_2$  range of  $0.30\text{ mg/l}$ . As for DO and pH, the values were mostly in compliance with the standards with DO range of  $1.2-9.6\text{ mg/l}$ ,pH range of  $7.0-10.6$  and SS range of  $12-49.67\text{ mg/l}$ . However, the study results showed that both ornamental fish species had proper growth in the treated wastewater.

**Key word** : Treated Wastewater, Constructed Wetlands

## Variation of Species and Density of Mosquito larvae in Constructed Wetlands .

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Comparison of mosquito larvae species and density in the Constructed Wetlands Wastewater Treatment System with 3 different Hydraulic Retention Time ( HRT ) , i.e. 0.01 ( 1<sup>st</sup> wastewater treatment system ) , 0.03 ( 2<sup>nd</sup> wastewater treatment system ) and 0.05 ( 3<sup>rd</sup> wastewater treatment system ) were investigated . 3 wells were serially arranged in each wastewater and 3 water quality parameters were studied. The results showed that there were 2 mosquito larvae species found , namely *Culex* spp. and *Armigeres* spp. . *C.* spp. was found in every well and the number found was as high as 99.35 % while *A.* spp. was found only in the first well of the first and third well of the wastewater treatment systems. *A.* spp. showed high tendency to occur in more polluted water. *C.* spp. had the highest average density in the first wells ranging from 9.88-105.13 mosquitoes / 0.005m<sup>2</sup> / 7 days while in the second and third wells the average densities were approximately the same ranging from 0.25-6.25 mosquitoes / 0.005m<sup>2</sup> / 7 days. *A.* spp. average densities were found to be as low as 4-5 mosquitoes / 0.005m<sup>2</sup> / 7 days only. BOD and mosquito larvae densities showed high tendency of positive correlation water temperature and pH were found to be in favor of living condition of aquatic lives.

**Key word** : Variation of Species, Mosquito larvae