

DIWPA News Letter

No.17

Message from the Secretary General of the DIWPA:

Leading role of DIWPA in the biodiversity and ecosystem studies in the new ESSP partnership

Initial Planning Workshop on Monsoon Asia Integrated Regional Study was held at the Southeast Asia START regional Center in the Chulalongkorn University in Bangkok, Thailand from the 23-25 March 2003. I attended this meeting on behalf of DIWPA, and herewith would like to report the summary of the meeting as well as my messages.

International global-environment programs (IGBP, IHDP, WCRP & DIVERSITAS) are merging to form a new partnership called "ESSP" and DIVERSITAS is among them. It is evident that a synergy is sought between global-environment studies and biodiversity-related issues. International START Office organized the March meeting to develop an integrated regional study in the Monsoon Asia region to meet ESSP challenges. We are far from understanding the region-to-globe physical linkages in driving the earth system and our premises are that there must be several critical regions in driving the earth system. The Monsoon Asia is such a region and this corresponds largely with our home ground "the Western Pacific and Asia." Six core investigation areas and cross-cutting issues were raised to be addressed in the integrated regional study: emission and energy, climate-related disasters and hazards, water in catchments and coast, food and fibers, human health, biodiversity and ecosystem changes, and cross-cutting issues. All participants have agreed that "biodiversity and ecosystem changes" are a critical issue in this region. What are the consequences

of the loss of biodiversity in the Monsoon Asian region and their feedback to the earth system? How can the conservation of biodiversity at ecosystem level be incorporated in the forestry sector and other economic developments? These are challenging questions addressed to biodiversity scientists in this region and can be answered only through a consultative network and a web of observation sites across the region. It is very natural to assume that DIWPA is the leading body in the Monsoon Asia region, which can contribute to the new integrated regional study in collaboration with the other global-change programs. It is therefore very timely that DIWPA will hold the symposium "**Perspectives of the Biodiversity Research in the Western Pacific and Asia in the 21st Century (December 18-19, 2003)**" to seek a synergy with global-change studies. In line with the attempt of the START/ESSP meeting to develop the integrated regional study, DIWPA will develop a new collaborative research proposal to answer such aforesaid critical questions. This newsletter issue informs to you the scope of the symposium as the 1st circular as well as the outline of the IBOY forest ecosystem database (article by M. Toda). I hope that many biodiversity scientists can participate the December symposium and contribute to the integrated IBOY database.

-Kanehiro Kitayama-

"Perspectives of the Biodiversity Research in the Western Pacific and Asia in the 21st Century"

Symposium Session on December 18-19, 2003

DIWPA Steering Committee Meeting on December 20, 2003

Kyodai-Kaikan, Kyoto, Japan

Organized by DIWPA (DIVERSITAS in Western Pacific and Asia)

Co-organized by the Research Institute of the Humanity and Nature, and by the 21 COE Biodiversity Program of Kyoto University

Sessions

- International Partnerships in Biodiversity Research
- Progress and Perspectives of the DIWPA-IBOY
- Carbon and Biodiversity
- Landscape Conversion and Biodiversity

DIWPA has been a leading body in the biodiversity research in the Western Pacific and Asia region. A cohesive network of researchers has been formed and the coordinated research program of biodiversity observation, DIWPA-IBOY, is producing fruitful results. Recent development of the formation of Earth System Science Partnerships among the major global research programs (IGBP, IHDP, WCRP) with DIVERSITAS clearly indicates the importance of the integration of biodiversity in global-environment research. The 21st Century will be a turning point whether human beings can adopt a new societal system to achieve the sustainable development without the loss of biodiversity in the face of global environmental crises. One of the challenges in the Western Pacific and Asia region will be the synergy between the mitigation for global warming and the conservation of biodiversity. The second issue is the harmony between land and resource development and

the conservation of biodiversity. In this symposium, participants will discuss how we can step forward to contribute to resolve global environmental issues pertinent to this region. Emphases will be placed on the progress of DIWPA-IBOY, and then the synergy between carbon sequestration mechanisms, landscape conversion and biodiversity. All people interested in any disciplines are welcome to participate.

Tentative Program

Morning of December 18:

- International Partnerships in Biodiversity Research (Session coordinator K. Kitayama)
21COE Program of Kyoto University
DIVERSITAS
START
IGBP (PlotNet)

Afternoon of December 18:

- Progress and Perspectives of the DIWPA-IBOY (Session coordinator T. Yumoto)
Forest ecosystems (M. Toda)
Island ecosystems (Dieter Mueller-Dombois)
Fresh water ecosystems (M. Yuhma & K. Nakai)
Coastal ecosystems (Y. Shirayama; yet to be confirmed)

Morning of December 19:

- Carbon and Biodiversity (Session coordinators T. Nagata & K. Kitayama)

The linkages between carbon and biodiversity in terrestrial and fresh water ecosystems will be discussed. The synergy between carbon sequestration mechanisms (particularly such an international mechanism as the clean development mechanism of the Kyoto Protocol) and biodiversity will be discussed.

Approximately five to seven invited speakers to be determined (nominations welcome)

Afternoon of December 19:

- Landscape Conversion and Biodiversity (Session coordinator T. Nakashizuka)

Biodiversity changes, and their mechanisms and causalities including socio-economic factors, the influence on function and services of ecosystem, and the traditional ways and systems that have kept biodiversity will be discussed in this session.

Approximately five to seven invited speakers to be determined (nominations welcome)

December 20, 2003

- DIWPA Steering Committee Meeting

All SC members are invited to attend the business meeting and a workshop to develop and draft a new research proposal for DIVERSITAS and ESSP. Important questions are: what are the biodiversity issues endemic to the Monsoon Asia region (or more widely the Western Pacific and Asia), which have regional and global consequences? What, if any, are the consequences of the loss of biodiversity in the Monsoon Asian region and their feedback to the earth system? How can the conservation of biodiversity at ecosystem level be incorporated in the sustainable development of the forestry sector and other economic developments?

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DIWPA will launch the database to house IBOY forest ecosystem data

DIWPA has long been discussing the possibility of developing an IBOY database, but has not been able to conclude where to place. Lately, DIWPA Steering Committee has approved that the DIWPA Office can temporarily house the database until we can locate a permanent clearinghouse. Prof. Masanori Toda has been actively developing a database. After a long preparation stage, now we can announce that this system will be installed in the new network server in the DIWPA Office. Prof. Toda describes the outline of the system.

We are now preparing a database for integrating and managing our DIWPA-IBOY data for forest eco-

systems. The coming database will be a single integrated one covering all observation sites, dealing with biodiversity data for plants, vertebrates and invertebrates, and to be housed in the website of DIWPA Office (Center for Ecological Research, Kyoto University).

The database will become a huge one, when it compiles the data from all sites, but is partitioned for each site. Only limited members, to whom the ID No. and password will be issued, of each site gain access to the respective partition for inputting and editing their own data. And, they can select the degree of opening of their data to only themselves,

other DIWPA-IBOY members, DIWPA members or the public.

DIWPA-IBOY Database

1. Invertebrate database

1.1. Introduction

DIWPA-IBOY covers a number of regions/countries in Western Pacific and Asia and various kinds of organisms such as plants, vertebrates, and invertebrates. Therefore, the database should be international in the true sense to integrate results from different regions/countries. The invertebrate database for DIWPA-IBOY is to be designed so that the taxonomic and ecological information at various taxonomic levels (e.g. order, family, genus, species) can co-exist and be dealt with in a single database at the same time. It is premised that 1) samples collected by various kinds of standardized methods are first identified and sorted at least at the order level, 2) after that, lower-level identification proceeds step by step from the order to the species level, and 3) the database continues to develop virtually until all samples or specimens are identified to species.

1.2. Outline of the invertebrate database

1.2.1. Unit of information

In general, the unit of information for a sample/specimen to be managed in the database can be either of the following two categories:

- 1) Vial with a label, containing wet specimen(s) belonging to the same taxon at a certain taxonomic level
- 2) Specimen lot comprising specimens with the same label in the dried/pinned condition

In which condition specimens should be preserved will depend on the level of identification of samples and taxon-specific properties. It is highly likely that many samples identified at the order level will be preserved in vials containing e.g. 70% ethanol, and thus the unit of them will be of category 1. On the other hand, some taxa that can be relatively easily dried and pinned (e.g. Coleoptera with hard body) or that are collected in the small number (e.g. Plecoptera, Mecoptera, and Megaloptera) may be preserved in the condition of category 2 even at this identification level. The unit of samples identified to the genus or the species level will be of category 2 in most cases. However, taxa with tiny and soft body (e.g. many taxa of Diptera) may be still preserved in the condition of category 1. Thus, the unit of information can be a vial or a specimen lot with the same label, and will change usually from category 1 to category 2 in the process of identification.

1.2.2. Relational database

A sample collected at a sampling event can be characterized by the following three items:

- 1) Sampling place (e.g. locality, site, and vertical position such as canopy/ground)
- 2) Sampling method (e.g. light trap or pitfall trap)
- 3) Sampling date (e.g. year-month-day)

A sample usually includes a lot of specimens, which share the same data for these three items. To record all of these data for each specimen in a single column-by-row table requires repeating input of the same data. Databases using such a kind of table are not only clumsy and error-prone, but also highly repetitive and therefore wasteful for human effort and time. Therefore, a relational database, storing and retrieving data in linked tables, should be designed to reduce repetitive input and redundant storage of data. Each of row

and column in a table represents a record and a field, respectively.

1.2.3. An ID system for data management

As mentioned in the Introduction section, this database is an internationally integrated one in the sense that results from a number of sites across regions, each with historically, geographically, and ecologically distinct fauna and flora, are input into and managed in a single database. To ensure that all data are smoothly managed (e.g. to input, inventory, and search data) in an integrated and compatible manner, an ID system should be developed and introduced in the database. In the ID system, records in three fields of Locality, Trap No., and Date are coded and form a three-level nested system: Locality Code - Trap No. Code - Date Code. The Locality Code is made up of the abbreviated names of a country and a site, e.g. [Country] [Site] → [Japan] [Tomakomai Experimental Forest] → [JP] [TO] → **JPTO**. The Trap No. Code provides information for sampling methods (Light, Malaise, Window, etc.) and spatial replicates of the methods (plot, stratum, soil layer, etc.), e.g. for Light trap, [Trap code] [Stratum code] [Plot No.] → [LT] [C] [1] → **LTC1**. The Date Code represents temporal information, e.g. [Year] [Month] [Day] → [2001] [April] [05] → **2001APR05**. In practice, such an ID system provides powerful utility to keep track of progress and find smoothly all the records relevant to these three codes of Locality, Trap No., and Date in an integrated way.

1.3. Management of data for samples/specimens

This section explores the idea for inputting and managing data, in particular answering the following two questions:

1) How should new data be input into the database as lower-level identification of samples/specimens proceeds?

2) How can we track the history of identification for a given sample?

Table 1 shows the procedure for inputting data into the database along the temporal sequence of identification of a sample from the order to the species level.

T₁: One hundred specimens of Diptera were collected by Light trap (LT) set at the canopy (C) in plot 1 on March 6, 2002 (2002MAR06) in Poring (PO), Sabah, Malaysia (MY), put into a vial containing 70% ethanol (Condition: Wet) and deposited in the insectarium of Kinabalu Park (KP).

T₂: Dr. Masanori J. Toda had a loan of the vial (as a whole) for identifying the specimens on April 19, 2002 (Date of loan: 2002APR19).

T₃: Dr. Toda reported the results of identification at the family level: Anisopodidae 10 specimens, Chironomidae 20, Muscidae 10, and unidentified 10, each of these sublots having been put separately into a vial containing 70% ethanol and returned to Kinabalu Park on October 9, 2002 (Date of return: 2002OCT09). However, 50 specimens of Drosophilidae were still on loan to Dr. Toda for further identification at the species level (Date of loan: 2002OCT09).

T₄: Dr. Toda reported the results of identification at the species level for Drosophilidae: *Drosophila melanogaster* 20 specimens and *Mycodrosophila albilabris* 5 were put into a vial containing 70% ethanol separately for each species and returned to Kinabalu Park on December 31, 2002; valuable 10 specimens of *Drosophila kinabaluana* were pinned as dry specimens (Condition: Dry), and 5 of them were returned to Kinabalu Park but the remaining 5 were deposited in Systematic Entomology, The Hokkaido University Museum, Hokkaido

University, Sapporo, Japan (SEHU) in agreement with Sabah Parks; 5 specimens of *Amiota* were being studied on loan by Dr. Hong-Wei Chen, a specialist of this genus, for further identification at the species level; the remaining 10 unidentified specimens were still on loan for further study by Dr. Toda.

You can obtain the latest data at a given time by extracting the records without any data in the 'Date of return' field, and can track a history of identification of a given sample by not deleting old records but retaining all of them.

-Masanori Toda-

Table 1. An example of management of data related to the Specimen table in IBOY database for invertebrate fauna

Red letters indicate the data that have been newly input into the database according to the time sequence of identification from order to species level and the loan-return history of samples.

Time	ID	Order	Family	Genus	Species	No of Ind.	Condition	Recipient	Date of loan	Date of return	Depository
T ₁	MYPO-LTC1-2002MAR06	Diptera				100	Wet				KP
T ₂	MYPO-LTC1-2002MAR06	Diptera				100	Wet	Masanori J. Toda	2002APR19		KP
T ₃	MYPO-LTC1-2002MAR06	Diptera				100	Wet	Masanori J. Toda	2002APR19	2002OCT09	KP
	MYPO-LTC1-2002MAR06	Diptera	Anisopodidae			10	Wet				KP
	MYPO-LTC1-2002MAR06	Diptera	Chironomidae			20	Wet				KP
	MYPO-LTC1-2002MAR06	Diptera	Drosophilidae			50	Wet	Masanori J. Toda	2002OCT09		KP
	MYPO-LTC1-2002MAR06	Diptera	Muscidae			10	Wet				KP
	MYPO-LTC1-2002MAR06	Diptera	others			10	Wet				KP
T ₄	MYPO-LTC1-2002MAR06	Diptera				100	Wet	Masanori J. Toda	2002APR19	2002OCT09	KP
	MYPO-LTC1-2002MAR06	Diptera	Anisopodidae			10	Wet				KP
	MYPO-LTC1-2002MAR06	Diptera	Chironomidae			20	Wet				KP
	MYPO-LTC1-2002MAR06	Diptera	Drosophilidae			50	Wet	Masanori J. Toda	2002OCT09	2002DEC31	KP
	MYPO-LTC1-2002MAR06	Diptera	Drosophilidae	<i>Amiota</i>	<i>spp.</i>	5	Wet	Hong-Wei Chen	2002DEC31		KP
	MYPO-LTC1-2002MAR06	Diptera	Drosophilidae	<i>Drosophila</i>	<i>Kinabaluana</i>	5	Dry				KP
	MYPO-LTC1-2002MAR06	Diptera	Drosophilidae	<i>Drosophila</i>	<i>Kinabaluana</i>	5	Dry				SEHU
	MYPO-LTC1-2002MAR06	Diptera	Drosophilidae	<i>Drosophila</i>	<i>melanogaster</i>	20	Wet				KP
	MYPO-LTC1-2002MAR06	Diptera	Drosophilidae	<i>Mycodrosophila</i>	<i>albilabris</i>	5	Wet				KP
	MYPO-LTC1-2002MAR06	Diptera	Drosophilidae	others		10	Wet	Masanori J. Toda	2002DEC31		KP
	MYPO-LTC1-2002MAR06	Diptera	Muscidae			10	Wet				KP
	MYPO-LTC1-2002MAR06	Diptera	others			10	Wet				KP

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