

BioResource Now!

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Introduction to Resource Center <No.41>

Messages from the representatives of the newly adopted core institutions in the 3rd stage NBRP

In this month's issue of the newsletter, 4 representatives from newly adopted resource centers of the third stage NBRP introduced their projects and ambitions.

"Chicken/Quail"

Yoichi Matsuda (Avian Bioscience Research Center, Graduate School of Bioagricultural Sciences, Nagoya University)

We were adopted as the NBRP Chicken/Quail core institution, which was initiated in the third stage NBRP. Thus far, I have been involved in the molecular and cellular genetic research focusing on birds and various other vertebrates, including amphibians and mammals, at Nagoya University and Hokkaido University. Following which, we have been involved in genetic research of poultry at the Avian Bioscience Research Center since the fiscal year 2009.

Japan is rich in avian genetic resources, especially Japanese chicken and other chicken and quail strains with various genetic properties. However, the availability of bird resources for research is inadequate and many precious resources are being lost because of the uneven distribution of industrial strains and restriction of research funds. At present, the NBRP Chicken/Quail maintains more than 20 chicken strains including *Gallus gallus*, highly inbred strains, long-term laboratory strains, and several disease models. The institution also preserves 7 long-term laboratory strains of quails including mutant strains for distribution. In the future, we aim at complementing the infrastructure for life science research by providing birds to researchers, by maintaining and breeding chicken and quail such that they meet the highest global standards in terms of both quality and quantity, and by realizing the stable distribution of the resources.

"Paramecium"

Masahiro Fujishima (Graduate School of Science and Engineering, Yamaguchi University)

We were adopted as the NBRP Paramecium core institution in the third stage NBRP and I, Dr. Fujishima, am the representative of the project. I have been using *Paramecium* for 34 years since my graduate school days. Paramecium is a crucial research resource with which many universal biological phenomena have been discovered. We have been collecting and preserving many species and strains belonging to the genus *Paramecium* for over 28 years in collaboration with researchers in and out of the country, aiming at elucidating the complete mechanism of endosymbiosis. Since Paramecium strains cannot be cryopreserved and senesce depending on the number of cell divisions, preservation of the strains needs some efforts.

Through the project, we provide a variety of *Paramecium* strains along with the information on the strains, such as their zygote types, collection years and sites, and characteristics. We distribute mutant strains and strains used for genome sequencings and transcriptome analyses. We also provide strains that maintain endocellular bacterial symbionts or symbiotic algae. Yamaguchi University maintains the world's largest number of monoclonal antibodies that target *Paramecium* and its intracellular symbionts. Distribution of these antibodies can also be requested. Although there are approximately 50 documented species that belong to the genus *Paramecium*, presently only about half of them can be collected in the field. This project will also be responsible for protecting the species of the genus *Paramecium*.

"Tropical clawed frog"

Masayuki Sumida (Institute for Amphibian Biology, Graduate School of Science, Hiroshima University)

We were recently adopted by the NBRP Tropical clawed frog in the third stage NBRP. We belong to the Division of Speciation Mechanism and hereby briefly introduce our project. Tropical clawed frog (*Xenopus tropicalis*) is still a developing animal model, which has been used by researchers for a relatively short period. Although the fundamental infrastructure related to *X. tropicalis* studies, such as research methods and information sharing, are considered insufficient, *X. tropicalis* has the following advantages as a biological resource: *X. tropicalis* is smaller than *X. laevis* and thus can be bred in a smaller space; 5 wild type strains exist and can be compared with each other; and lastly, *X. tropicalis* has a short generation time, a diploid genome and the entire genome information is available. For these reasons, genetic analysis is easier in *X. tropicalis* than in *X. laevis*, and research requiring gene knockouts and availability of the entire genome sequence can be undertaken in *X. tropicalis*. Therefore, *X. tropicalis* is considered to be a bioresource with great potential, and it can be improved upon and it can contribute to life science research in the future.

Currently, the project aims at expanding user base for the resources we provide, through development of high-quality inbred strains, establishment of standard strains, improvement of distribution infrastructure, preparation and distribution of experimental protocols, enhancement of user support, and cultivation of international co-operation, in order to further develop and promote research with *X. tropicalis*. We sincerely appreciate the users' opinions and requests.

"Cord blood stem cells for research"

Shunichi Kato (School of Medicine, Tokai University)

We were adopted by the NBRP Cord blood stem cells for research in the third stage NBRP. This project was originally a part of "The project for realization of regenerative medicine" of the Ministry of Education, Culture, Sports and Technology from 2003 to June 2012, and the project was then continued as a division of the NBRP since July 2012.

Research in cord blood transplantation and stem cells in Japan is globally distinguished and the accumulated number of cord blood transplants, via the Japan Cord Blood Bank Network, exceeded 9,000 cases, which accounts for approximately one-third of all the cases in the world. Among the cord blood samples that have been provided to the cord blood bank, those that cannot be used for transplants and have been approved for distribution for research studies are provided to researchers in and out of Japan through this project.

In collaboration with the cord blood bank for transplants, we acquired agreements stating that the cord blood can be used in a variety of medical and biological studies, including studies on hematopoietic and mesenchymal stem cells, cancer, immunology, infectious disease, allergies, drug discovery, genetics, environmental medicine, and iPS cells.

Please contact us for distribution of cord blood stem cells (mononuclear cells, nucleated cells, and CD34+ cells) and fresh cord blood (within 36 h from acquisition).

Announcements

The 4th ANRRC will be organized in the Cheju Island, Korea.
Date: October 17 (Wed) – October 19 (Fri), 2012

Exhibition at the 90th Anniversary the 64th Annual Meeting of the Society for Biotechnology, Japan
Date: October 24 (Wed) – October 26 (Fri), 2012



The 2nd Training Course for Cellular Slime Molds as Model Organism
Date: November 23 (Fri. holiday) – November 25 (Sun), 2012
Place: Second cluster of colleges, University of Tsukuba
Participation Fee: Free of charge (transportation and accommodation costs are self-paid.)

The 35th Annual Meeting of the Molecular Biology Society of Japan NBRP Panel Exhibitions with Realia: "Full Array of Bioresources"
Date: December 11 (Tue) – December 14 (Fri), 2012
Time: 9:00–17:00 PM (until 4:15 PM on the final day)
Place: Marinemesse Fukuoka, Fukuoka Convention Center

Introduction of Backup Software for Linux Servers "Mondo Rescue"

Importance of Backup

There is no doubt that backing up a server is important for server administration. Our servers, which have been running for a long time, crashed due to a power failure caused by lightning strikes recently; therefore, we undertook recovery operations of the system by using a backup. However, since operating system (OS) image and a part of the application configuration had not been backed up, it took a great deal of time to restore the system. This made us acknowledge the insufficiency of simply having a backup and the importance of preparing an OS image backup and recovery procedures for a prompt system restoration.

OS image backup

The most important data to be backed up are the content files for a Web server and user data such as database (DB) files for a DB server. In addition, backing up an OS image is the best idea to speed up the system restoration. In this issue of the newsletter, "Mondo Rescue," which is able to backup the entire OS and data on a Linux server, will be discussed.

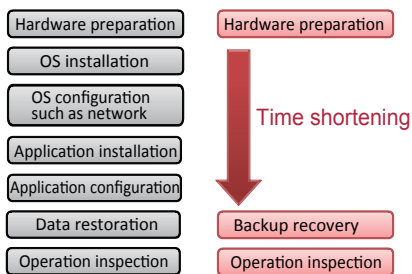


Fig. 1: Difference in restoration time with or without OS image and application configuration recovery

What is "Mondo Rescue" backup software ?

"Mondo Rescue" is an open-source software, operable in a Linux system. Besides its normal file backup function, the software can also backup the entire OS image and create recovery media for restoring the system easily from the media, in case of trouble.

① Installation Method

First, install the "Mondo Rescue" into a target server to be backed up. Here, the installation method and backup procedure for CentOS 5.8 are explained.

The following 5 files are necessary: "afio," "buffer," "mindy-busybox," "mindy," and "mondo." Download the corresponding rpm files from the public ftp site of Mondo Rescue and install the files using the following command:

```
# rpm -ivh *.rpm ( Public ftp site of Mondo Rescue:
ftp://ftp.mondorescue.org/rhel/5/i386/ )
```

Recommended Book ! <NO.9>

"Tsuyoi mono wa ikinokorenai (The strong cannot survive)" By Jin Yoshimura (Shincho Sensho, 2009)

The author became famous for brilliantly elucidating the mystery of so-called "prime-numbered cicadas," which occur in large outbreaks in every prime-numbered year (such as 13 or 17 years). The book brings a wide array of organisms into view and describes the evolutionary mechanism from a unique viewpoint that is different from the conventional evolutionary theory as implied by its subtitle, "Kankyo kara Kangaeru Atarashii Shinkaron (A Novel Evolutionary Theory Proposed from a Viewpoint of Environment)." The conventional evolutionary theory proposed by Darwin and others studied the ways in which natural selection occurs, on the premise of "unchangeable environment." For example, in the integrated theory of evolution, which focuses on population genetics, adaptability of a mutant can be given as a displacement from a wild type, i.e. relative adaptability ($W = 1 + s$). However, this assumption of wild type being stable, neglects an obvious recognition of wild type's failure to be stable in certain types of environmental changes, although wild type's stability may not be affected by trivial environmental changes. Nevertheless, in response to a sufficiently great deal of environmental change, a wild type organism will have to survive through the change and adapt itself to a new environment, or become extinct; hence, evolution and extinction are inextricably linked. Thus, according to the author's view, in a changing environment, organisms adapted to environment A will be dominant in environment A, but may be inadapted and extinct in environment B, whereas those who moderately adapted to both the environments, will survive both environments. Accordingly, the author's environmental-fluctuation theory proposes that adaptation to changing environmental conditions, rather than reproductive success, may be the key to long-term survival of the species. (K.N.) (This book is only in Japanese)

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② Usage

Backup is conducted by executing the following command from the command prompt.

```
# mondoarchive -Oi -d /backup -s 4480m -E /data -p backup20120920
```

The options used in the above-mentioned command are listed below (Table 1).

Options	Description
-Oi	Create iso images
-d	Designate directories and devices to store backup images
-s	Specify media size
-E	Designate directories excluded from backup
-p	Specify the name of output backup file

Table 1: Options used in the backup command

Upon completion of executing the command, ISO image file is generated in the directory designated by the -d argument and thus can be written on DVD media for creating recovery media or transferred to tapes or other media. Moreover, by executing the abovementioned command through a cron job, a periodical and automatic backup can also be undertaken.

③ Recovery function from media

In case of trouble, a server can be restored to the condition at the time of backup by booting from the recovery media created at the process ② after the preparation of an alternative server.

In conclusion

It is recommended to reexamine whether a sufficient backup operation framework has been established. As an old proverb says, "Be prepared and have no regrets." Although people tend to be confident simply with the initial configurations for backup, it would be important to think of day-to-day administrations, including systematization of recovery procedures, restoration training, and periodic monitoring of ordinary backup operations in order not to panic in case of trouble.



(Takehiro Yamakawa)

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Editor's Note

Representatives of the newly adopted projects in the third stage NBRP have contributed to this month's issue of the newsletter with write-ups that describe their projects and future ambitions. Although the projects were newly adopted, they were launched promptly and are expected to be improved upon and developed further with the scholarly experience and expertise of the newly appointed representatives.

Please look out for the special articles in this newsletter which will be featuring the newly adopted resources. (Y.Y.)

BioResource Information

(NBRP) www.nbrp.jp/
(SHIGEN) www.shigen.nig.ac.jp/
(WGR) www.shigen.nig.ac.jp/wgr/
(JGR) www.shigen.nig.ac.jp/wgr/jgr/jgrUrllist.jsp