

BioResource now !

Our monthly newsletter features a variety of information, highlighting current domestic and international issues concerning bioresources.

Introduction to Resource Center No.23

"Chicken"

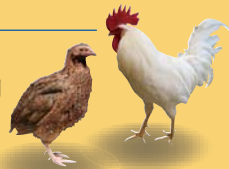
Takashi YOSHIMURA
 Nagoya University Avian Bioscience Research Center

"Japanese Quail"

Makoto MORI
 Faculty of Agriculture, Shizuoka University

Ongoing Column No.31

Support Tools for Web Designing ~ IE, Firefox, Safari ~



A feather mutant strain of a quail (left) and a typical inbred strain (WL-G) (right)

Introduction to Resource Center No.23

"Chicken"

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Bantam (Black)

1 Importance of the Chicken

The chicken is a descendent of Asian red junglefowl (*Gallus gallus*), which was domesticated around 5,400 B.C. and is an important and popular food resource. Birds hold an important place in the course of evolution since they are a link between mammals and other vertebrates. The chicken, in particular, is a model organism representative of approximately 9,600 existing avian species. Historically, chickens have greatly contributed to various research fields such as oncology, virology, immunology, and developmental and neural sciences, and in the production of vaccines and pharmaceuticals. The number of chickens utilized as experimental animals reaches more than 1/20th of the number of mice and 1/2 that of rats used in experiments.



Red junglefowls, the origin of chickens. Female (right) and male (left).

2 Current Status of Chicken Genetic Resources

The importance of chickens as genetic resources has been increasingly recognized as a result of chicken genome sequencing, which was completed in 2004. However, avian bioresources are gradually disappearing out of the country owing to the reduction of research budgets for these resources and the consequent lack of efforts in preserving them. According to reports of the Avian Genetic Resources Task Force (AGRTF), 268 strains of chickens disappeared in the US and Canada between 1984 and 1998, and the trend is unchanged. Since a cryopreservation technology for avian embryos has not yet been established, strains have inevitably been maintained as living collections, which further accelerates this trend. Therefore, the preservation and distribution of chicken resources in our country has attracted considerable attention and raised expectations.

Nevertheless, most chicken strains used in tests and research were originally developed for commercial purposes (strains with extremely high heterogeneity produced by hybridizing multiple chicken species); thus, genetically standardized strains currently account for an extremely low fraction.



Uzura
 This is a small strain used as a pet; it was originally developed in Kochi prefecture and is characterized by the absence of tail bone and tail feathers.

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• <http://www.shigen.nig.ac.jp/shigen/news/>

Other information on bioresources is available at

- ◆ NBRP <http://www.nbrp.jp/>
- ◆ SHIGEN <http://www.shigen.nig.ac.jp/>
- ◆ WGR <http://www.shigen.nig.ac.jp/wgr/>
- ◆ JGR <http://www.shigen.nig.ac.jp/wgr/jgr/jgrUrlList.jsp>

Announcements (Details are available at : <http://www.nbrp.jp/>)

- The 4th Symposium on *Lotus japonicus* and *Glycine*
 Date: May 15 (Thursday) 12:00- to May 16 (Friday) , 2008
 Place: Plant Science Center, RIKEN Yokohama Institute
 Fee: Free of charge
- The 18th Joint Symposium on Yeast: A Challenge from Yeast Cells
 "For comprehensive understanding and application of biological phenomena"
 Date: June 5 (Thursday) - June 6 (Friday) , 2008
 Place: Koyu Hall, Konan University (Higashinada-ku, Kobe-city)

"Japanese Quail"

Makoto MORI, Professor
 Faculty of Agriculture, Shizuoka University



1 Quails and the Japanese

It is well known that Dr. Mamoru Mohri was to be the first Japanese astronaut; however, the rocket launch was postponed due to the explosion of the Challenger, and Mr. Toyohiro Akiyama from the Tokyo Broadcasting System (TBS) and a Japanese tree frog became the first Japanese astronauts. Few people know that nine months before that, a Japanese quail hatched in "Mir," a space station of the former Soviet Union on March 22, 1990.

The Japanese quail (*Coturnix japonica*), like the chicken, is an avian species belonging to the order Galliformes and the family Phasianidae, and is considered the sole animal that was domesticated by the Japanese. Globally recognized domestic animals such as Japanese cattle, Dosanko (horses native to Hokkaido), and native Japanese chickens are in fact imported from overseas; since farming, breeding, and genetic control of these animals has been possible, they have been improved such that they can adapt to the climates in Japan. Japanese quails were domesticated and bred as Naki-uzura by the Japanese since the Civil War Period, and their strains were gradually improved for egg-laying in the Taisho Period.

From the historical viewpoint of domestication, Japanese quails are important bioresources by which we can establish an international initiative to make the most of our originality. In fact, Dr. Kojiro Shimakura from Hokkaido University indicated the potential of Japanese quails for use as experimental animals for the first time in 1940. Subsequently, Dr. Takatada Kawahara from the National Institute of Genetics, Dr. Kyoji Kondo from Nagoya University, and Dr. Kazutaka Homma from the University of Tokyo have enthusiastically explored the feasibility of using Japanese quails as experimental animals. As a result, Japanese quails became an animal species that is indispensable to the progress of life science research. They are currently used by numerous domestic and foreign researchers and have even been flown into space. Recently, Japanese quails were also recommended as a model experimental avian species for the safety assessment of chemical compounds by the Organization for Economic Cooperation and Development (OECD).



A male quail in the cage and a female outside it, implying that the male was preferred as Naki-uzura (preserved in the Takatomachi History Museum, Ina city, Nagano prefecture).

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3 Mission of the Research Center



Japanese bantam (Miuro-goishi), a typical pet species in Japan. It is small and has short legs. Subgenera with feathers in various colors have been established.

At the Department of Applied Biological Chemistry, we value contributions to the poultry industry in Aichi prefecture and have continued the "Preservation Project of Wild and Domestic Fowl Strains," supported by the Ministry of Education since 1952. Our research center was founded in response to the beginning of "Expansion of Post-genome Research in Avian Life Science: Preservation and Development of Biodiversity in Avian Genetic Resources and Applications to High-dimensional Functional Research," supported by the Special Funds for Education and Research (Research Promotion) from the Ministry of Education, Culture, Sports, Science and Technology since the fiscal year 2007.

Our research center has been maintaining 18 strains of chicken, including 10 strains that have been highly inbred by a sophisticated method to homogenize polymorphic markers. We have also been providing genetic resources and research information. Although the number of researchers expected to use standardized strains of chicken is considered quite high, aside from our research center, there are only a few institutes that preserve internationally acknowledged inbred and highly-inbred strains. The number of sample depositions has been increasing every year, and 4,885 individuals were contributed in the fiscal year 2007 (41% from external institutes; 3,546 were inbred strains).

In future, we would like to accelerate our activities and contribute to the formation of an avian researchers' community and the development of avian research in the country. ■

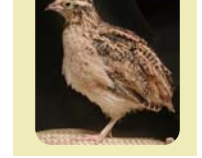
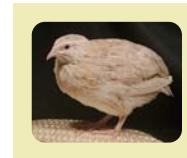
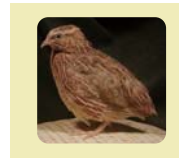
Polish bantams (A pet species native to Europe. It is small and has a feather comb and a V-shaped crest. Moreover, a rare characteristic of cranial bone elevation is observed).



2 Experimental Animals

Avian species hold a special rank among vertebrates and are categorized as animals that greatly differ taxonomically from mammals, amphibians, and fish with regard to factors such as physiological ecology, reproductive development, and environmental adaptation. Avian species not only play an important role as components of terrestrial, aquatic, and aerial ecosystems in the natural environment but also share historically an intimate association with human society. Among approximately 9,600 avian species, Japanese quails require the shortest time to sexually mature and begin producing eggs 6 weeks after hatching. The weight of Japanese quails is approximately 140 g, and their eggs weigh 10 g. Japanese quails can be easily reared and bred throughout the year: Their eggs require 17 days to hatch, and thus, 6 generations can be cycled within a year. The wild-type species that is used for domestication is also available.

Although Japanese quails are important biological species as the fundamental element in life science research, no collection method of Japanese quails has been established by public institutes and there are no defined standard strains worldwide. Currently, most strains of Japanese quails maintained at Shizuoka University have been originally collected and maintained by Dr. Akira Nakamura at Shizuoka Woman's College for genetics research over many years. No specific cryopreservation technology for avian embryos has been established yet; therefore, strains are maintained as living individuals. In future, a permanent preservation framework will be constructed by cooperating with other research institutes. ■



A feather mutant strain of a quail

10 minutes Information Technology - 31 - Support Tools for Web Designing ~ IE, Firefox, Safari ~

In this issue, I would like to introduce support tools for web designing. If you have some experience with web designing, you might have faced this problem where your webpage will look and perform differently with different browsers. There are several good software applications for web designing, such as Dreamweaver. However, these software applications do not check your webpage with different browsers and you would have to manually confirm whether a webpage is displayed as it should for each browser. For those who frequently have trouble identifying the cause of bugs, debugging tools are now publicly available. These tools enhance the functions of major browsers such as **Internet Explorer (IE)**, **Firefox**, and **Safari**, and assist in debugging the web designs.

In **Firefox**, a tool called "**Web Developer**" is available. Type "Web Developer" in the search box of the Firefox Add-ons website as shown below to search for the tool and then install the add-ons by following the directions. The "Web Developer Toolbar" will be displayed and several functions which will enable you to control cookies, display outlines for the div and table tags and show comments will be added.

■ Firefox Add-ons :
<https://addons.mozilla.org/en-US/firefox/>

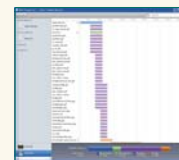


In **IE**, a tool called "**IE Developer Toolbar**," is available. This tool can be downloaded from the download page of the IE Developer Toolbar (<http://www.microsoft.com/downloads/details.aspx?FamilyID=e59c3964-672d-4511-bb3e-2d5e1db91038>) and installed by following the directions. It can be used by clicking the "IE Developer Toolbar" button on the tool bar.



(The button may be hidden on the right side if the toolbar is narrow.) By using the region enclosed by a red box on the left figure, IE settings such as displaying and changing DOM, accessing and editing HTML tags, validating HTML, invalidating caches, and changing the window size of the browser, can be changed.

For **Safari**, you can add the Develop menu to the menu bar to use more advanced features. Open the window to control the browser settings (for Windows, select "Preferences" from the "Edit" menu), click the "Advanced" tab and then select the "Show Develop menu in menu bar" checkbox. Subsequently, a Develop menu will be added and tools such as "Web Inspector", "error console" and "network timeline" will be available.



(Gaku KIMURA)

Editor's Note Two doctors contributed articles on avian resources for the first time in our newsletter this month. Previously, chicken bioresources were preserved in our "chicken coop" at the National Institute of Genetics, which has now become a center equipped with computers that is called the "K-building." We have a great regard for the endeavors of the researchers who have maintained world-class avian resources for more than half a century. I did not know about the Japanese quail that was hatched on a space station. Given the threat of avian flu in recent times, more attention should be focused on avian resources. We would like to thank Dr. Yoshimura and Dr. Mori for their contributions. (Y.Y.)



Coming up in the next issue!
The special topic on resources discussed in the next month's issue will be "**Zebrafish**".

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