

Integrating Biodiversity and Bioresource Information in Korea: Mission of KOBIC (Korean BioInformation Center)

Chang-Bae Kim*, Jae Woo Yoo, Taehui Hong, Gee-Chan Ryu and Jong Bhak

(Korean BioInformation Center, Korea Research Institute of Bioscience and Biotechnology, Daejeon 305-333, Republic of Korea)

*changbae@kribb.re.kr

Biological species described in the taxonomic community and their biological resources are indispensable for the research of life science. A large number of new species have been discovered and mutant strains are being produced in laboratories. Therefore, the development of databases and genomic analysis of the expanding variety of living organisms, their preservation, and distribution for the efficient proliferating these bioresources and their information have become extremely important. These are not only for basic research but also in the fields of applied science such as medicine and agriculture. The world is now entering into a biological revolution era where biological resources became as important as inorganic resource such as petroleum. The foundation of the biological resource lies in the diversity of biological species and their derivatives.

Under these circumstances, the National Committee for Genetic Resource Management was initiated in Korea and issued a report on the national bioresource/bioinformation management in 2005. This was spearheaded by the Ministry of Science and Technology (MOST). The report made recommendations primarily for the establishment of national databases of information containing the characteristics of these organisms and the development of networks for their wide and effective use. As the first concrete step for the creation of such a system, The Korean BioInformation Center

(KOBIC) was established on March 31, 2006 under the auspices of the MOST. KOBIC's main activities are composed of developing (1) genomics and bioinformatics infrastructure, 2) bioresource, and 3) biodiversity information infrastructure of Korea. KOBIC performs research, development and service in the above three fields (<http://www.kobic.re.kr>).

As the national core information facility for biodiversity and bioresource, the objective of KOBIC is to provide national survey on current status of biodiversity and bioresource management, the systematic integration of dispersed nationwide of biodiversity and bioresource information, and collection, analysis, and distribution of biodiversity and bioresource information. It aims to function as the infrastructure of life science and biotechnology research and the Korean national biodiversity and bioresource information portal. KOBIC also (1) develops, distributes, supports, and coordinates access to a variety of databases and software, (2) equips every resource with databases, (3) provides information to users, and (4) develops and promotes standards for databases, data deposition and exchange (Figure 1).

The activities of KOBIC include URL links to related public websites dealing with biodiversity and bioresource information for providing a portal site (Korea Bioresource Information Portal, <http://www.bioall.org>; Figure 2) for researchers to find where they can obtain biodiversity and bioresource information. KOBIC's web portal has a middleware foundation called BioMatrix where all the major bioinformation resource is tabled as a matrix. Above the BioMatrix level, BioPortal provides bioinformation service including biodiversity and bioresource information. The websites contain information from governmental institutes, museums, resource centers, research institutes, and universities. Each link or data entry is composed of (1) the related species name, (2) the database name, (3) the organization name, (4) the website address, (5) keywords, and (6) systematic categories for the website or data. An integrated search can be carried out on all the contents of these

data fields. The contents of KOBIC site updated regularly. Also, KOBIC accepts feedback from end users. In addition, KOBIC supports openfree acquisition and distribution of bioinformation (see <http://biolicense.org>) and advocates an open hypertext system such as wiki, as exemplified in Bioversity.org portal (<http://bioversity.org>).

KOBIC also collects information concerning biodiversity and bioresource from resource centers by official contracts and provides an easy-to-use integrated database to ensure that these resources will be utilized efficiently. Now, the subjects of 20 networked databases are entomopathogenic fungi, green algae, reference microorganism cultures, mouse, lichen, plant cell lines, aquatic plant, mutant fruit fly strains, marine algae, and bacteria cultured from kimchi. The number of databases integrated will be increased continuously (Figure 3). In addition, to support the database construction of resources on demand by researchers and institutes who maintain resources, KOBIC provides software represented as BioALL for supporting systematic management of the information across the country.

For efficiently collaborating with GBIF, KOBIC takes the role of the Korean GBIF governing board (KBIF). The activities of KOBIC for GBIF is providing KBIF portal, host biannual KBIF meeting to discuss with GBIF national work programs as a mission of biodiversity subcommittee of the National Committee for Genetic Resource Management and preparing future programs for promoting collaboration among Asian countries.

Even if biodiversity, bioresource and their information are full of hidden potential, its true value can only be recognized with actively participating end users. We consider that releasing information to the public plays a great part in evaluating resources through a broad vision. Moreover, publicizing information provides enlightenment on structuring an appropriate infrastructure system. We believe that biodiversity and bioresource, and genomic information extracted from these will promote the

efficient application of the bioresource and support research of life sciences extensively. It will establish a basic infrastructure of biotechnology in the era of personalized genomics.

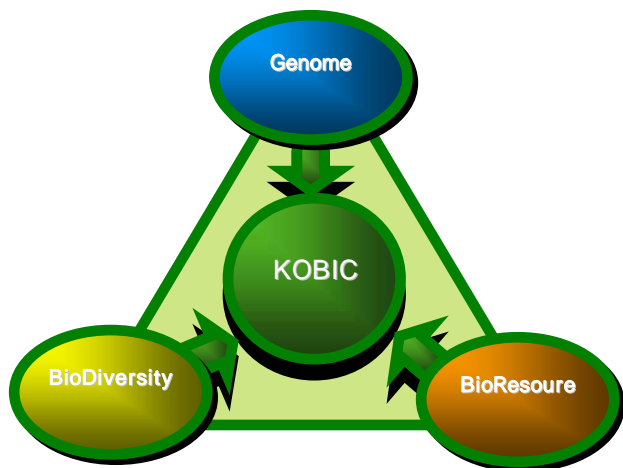


Figure 1. Korean National information data network by KOBIC

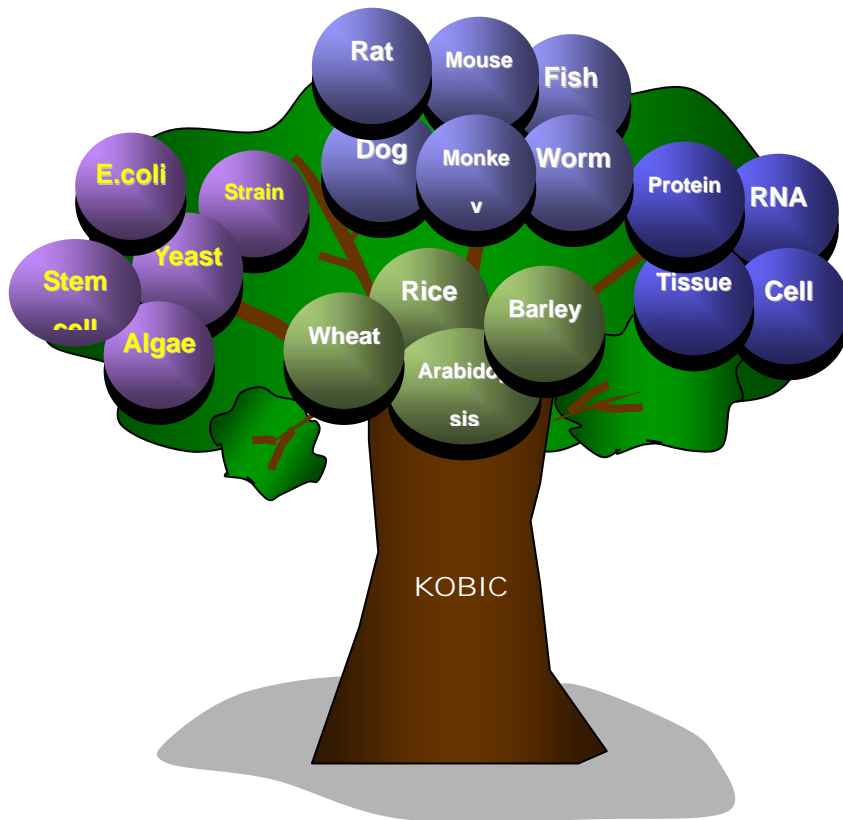


Figure 2. Data and databases integration in KOBIC



Figure 3. Korea bioresource information portal maintained by KOBIC