

## Experimental Plant Division

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#### Summary

1. **Achievements during the last three years (FY 2006 to FY 2008)—banking, research and development, international collaboration, public relations, training and education, and others**

● **Evaluation**

Achievements exceed expectations.

**Specific Comments:**

- In terms of research on *Arabidopsis*, RIKEN BRC has not only secured its position as one of the three core centers in the US, UK and Japan, but also has become the most active center among them.
- RIKEN BRC responds to expectations from communities appropriately and is actively involved in developing new bioresources and advertising its activities to the public.
- The *Arabidopsis* project has developed into another project on other crops such as *Brassica rapa*.
- Plant cultured cell lines are unique resources.
- Training has been given to staffs involved in projects on genome, cultured cells and mutant resources.
- The upgrading of the BRC catalogue and database, and transcriptome analysis of *Brassica rapa* in relation with *Arabidopsis* genome are noteworthy.

● **Advice and suggestions**

- Because the genome resources, mutant lines, and natural accessions of *Arabidopsis* are core resources of this division, further efforts should be made to improve their quality by analyzing phenotypes and so on.
- The genome resources mainly consist of the cDNA clones developed by RIKEN PSC. In the future, in addition to cDNAs, it is advisable to collect BAC libraries.
- The expansion of project from a model plant (*Arabidopsis*) to model crops not only follows domestic and international trends but also leads to future demands. For this reason, the

responsibilities of RIKEN BRC are becoming important.

- The rapid progress in establishing databases that regard Arabidopsis as a core model plant will create and expand a research community.
- If SABRE is expanded to form a network between Arabidopsis and its closely related plants as well as further expansion to the distantly related plants (including an improvement in ABRANA), accesses by researchers will increase.
- As rapid progress is expected to be made in analyzing the genome sequences of various plant species, the importance of informatics will increase furthermore.
- It will be important to select appropriate plant species for creating comparative genomic resources. Development of informatics will be also important on this subject.
- In cultured cells, their genome structure and gene expression may change during preservation. For this reason, quality control techniques play an important role to maintain the unchangeable characteristics of cultured cells. While it is important to control the quality, it will be the key issue to decide how strictly we need to follow the requirements in quality management. Establishment of standard operation protocol (SOP) is advisable.
- Training of staff that engaged in the resource project will be increasingly important.
- It is encouraged to promote international relationships to understand the trends of world research, particularly in the Asian region. If we can obtain resources and information from Pakistan, China and other Asian nations, when compared with two overseas centers, they will become characteristics of our center.

## **2. Responses to issues raised in the Resource Committee meetings of the past three years (FY 2005 to FY 2007)**

### **● Evaluation**

There has been a serious effort to respond to the comments, and BRC's operations have expanded as a result.

#### **Specific Comments:**

- Resource collection unique to the RIKE BRC has been made. The development of a technique for cryopreservation of plant cultured cells was a great progress.
- The collaboration with researchers specializing in crops such as *Brassica rapa*, which is closely related to Arabidopsis, is highly evaluated.
- The updating of the BRC catalogue, particularly the addition of photographs to the SASSC catalogue, is very effective for getting an image of bioresources.

### **● Advice and suggestions**

- While efforts should focus on improving and collecting resources unique to RIKE BRC, promotion of community demand by the improvement of resource quality should also be considered.
- Further improvement is required not only in the materials such as seeds and cDNA clones but also in the information of resources..
- It is advisable to consider improvement in the quality of image data (a system to enlarge images, when required).
- The development of a preservation techniques are important and will greatly contribute to BRC's research.. Promotion of the practical application of such techniques is required.
- It is necessary to establish a network among researchers studying model plants and those studying model crops.
- It is advisable for RIKEN BRC to provide user-friendly information (for researchers, students and breeders) in collaboration with crop researchers and crop research data from the Ministry of Agriculture, Forestry and Fisheries.
- It may be desirable to collaborate with researchers not only in Japan but also in foreign countries, particularly in other Asian nations, in crop research projects.
- It will be increasingly important to establish a global network through international conferences.

### **3. Are there any bioresources that are needed urgently within the next two to three years**

#### **● Advice and suggestions**

- Establishment of cultured cell lines from the Arabidopsis wild strains is important. Continuous effort on this project is recommended.
- The development of full-length cDNA resources, where Japan is playing a leading role in the world, is an important international contribution.
- It is worthy enough to consider collecting cDNA libraries (including those made in other countries) of Brassicaceae crops, including *Brassica rapa*.
- Information on the characteristics, including environmental responses, of wild strains is important in terms of the relation with SNPs.
- It is recommended to evaluate the additional FOX lines from PSC carefully and thoroughly.
- As the database will become increasingly important, its improvement through the collaboration with other institutes is recommended.
- Further development of online catalogues (along with photos, morphological and physiological properties) is recommended to be considered.
- SABRE and ABRANA, which are important for cross-species analysis, are required to be improved. Collaboration with crop research community should be considered in order to

extend the project from basic research to practical applications. It is recommended to provide data on cDNA resources in other institutes by using information from public databases.

#### 4. Others

##### ● Advice and suggestions

- It is recommended to promote public relations continuously to emphasize the importance of bioresources. This will require substantial effort and financial support.
- If a culture kit of a model plant is used in classes at school, it will be a tangible demonstration of BRC's activities.
- The importance of Arabidopsis in plant science will decrease gradually, and so expansion to other plant species will be the major subject to be considered for plant resource project. If Brassicaceae plants (crops) are applied to the project, it would be difficult to prepare genome resources for functional analysis. Therefore, it is important to develop fundamental technologies needed for transformation and establishment of cultured cell line.).
- RIKEN BRC is suggested to organize an international symposium on resources related to Brassicaceae plants, mainly targeting the Asian countries, to exchange information on resources. It will be a good idea to invite researchers who might donate resources.