

## Natural Resources Inventory Center

The mission of the Natural Resources Inventory Center is: 1) to perform fundamental research on the classification, identification, characteristics, and functions of agro-environmental resources such as soils, insects, and microorganisms; 2) to promote and support research in these areas through collection, preservation, exhibition, lending, and donation of specimens and samples; 3) to store all agricultural environment information collected in databases, and to develop inventory systems that can be accessed with the aid of tools such as the Internet; and 4) to collect and evaluate microbial and insect genetic resources as a sub-bank under the MAFF Genebank Project, in collaboration with related research groups.

The Natural Resources Inventory Center has 3 laboratories: Soil Classification, Insect Systematics, and Microbial Systematics. Each laboratory has its own Museum. In accordance with the NIAES mid-term research plan formulated in FY 2001, these laboratories have carried out the following research: 1) classification and elucidation of the functions of soils, and construction of a framework for a soil inventory; 2) construction of a database for type specimens of insects, and construction of a framework for an insect inventory; 3) classification and identification of the microorganisms inhabiting gramineous plants, analysis of their functions, and construction of a framework for a microorganism inventory; and 4) collection and evaluation of insects and microor-

ganisms as genetic resources.

Major topics covered in 2003–04 are described in the *Topics* that follow and in the main Research Results.

### Topic 1: Publication list and images of NIAES insect type specimens on the Web

The name of organisms is composed of generic and specific name, and the type specimen is usually a single specimen by which the specific name is confirmed as being connected to an actual species. Type specimens sometimes need to be examined to enable the precise identification when researchers are faced with taxonomic problems. However, it is not always easy to examine type specimens, because they are often deposited in foreign countries. Moreover, the location of the depository of the type specimen is occasionally uncertain. Therefore, publication of a list of type specimens and their images on the Web should make it easier to find depositories and observe the morphological characters of the type specimen without the risk of loss or damage during transportation.

Presently, NIAES holds more than 500 primary type specimens at our Insect Museum, and we have published a list of 508 type specimens on our website. We have also published digital images and label information, together with the original references to 279 type specimens (10 Neuroptera, 233 Coleoptera, and 36 Hymenoptera) (Fig. 1). This information can be seen at the fol-



Fig. 1 Screen display of *Images of NIAES Insect Type Specimens* on the Web.

lowing URL: <http://www.niaes.affrc.go.jp/inventry/insect/inssys/typelst.htm>. We will acquire the images of the remaining type specimens within the next 2 years. These efforts will help researchers in searching for specimens and examining their characters.

The number of institutes that publish information on their type collections will increase in the future. We anticipate that the resultant connected image database of type specimens will act as a pictorial book on the Web, forming an identification support system. (Y. Nakatani, K. Yasuda and S. Yoshimatsu)

## Topic 2: Construction of a microbial inventory and its exhibition on the Web

Microorganisms present in the agro-environment play important roles in conservation of the agro-ecosystem, and their various functions are also used in agriculture and industry for crop production, food production, and bioremediation. In addition, since the Convention on Biological Diversity, which Japan has signed and ratified, more information on global biodiversity has been required worldwide. However, we still do not have enough information on microorganisms recovered from the environment – for example, from plants, soils, and water. We are therefore developing an inventory of microorganisms isolated from the agro-environment.

The microbial inventory, which we have named *microForce*, was constructed for exhibition on our website (<http://www.niaes.affrc.go.jp/inventry/microorg/index.html>) (Fig. 2). The system consists of 3 new databases:

1) a microorganism museum specimen database; 2) a 2,4-D-degrading microorganism database; and 3) a *Burkholderia cepacia* complex bacterial database. In addition, we have developed an integrated retrieval system by modifying a system constructed by Dr. S. Miyazaki of the National Institute of Genetics, Shizuoka. Users of this integrated retrieval system can simultaneously retrieve from all 3 databases all the information associated with particular keywords. Details of the 3 new databases are as follows:

### 1) Microorganism Museum specimen database

This database lists information on 448 specimens collected by the Microorganism Museum of NIAES since 1880. Color pictures of specimens of microorganisms that cause various diseases (e.g., rust, powdery mildew, smut), together with the isolation year, place, and source of each microorganism, are exhibited on the website.

### 2) 2,4-D-degrading microorganism database

The database of 2,4-D-degrading microorganisms (161 records) was constructed from reference information. It contains isolate numbers, scientific names, isolation years and sources, and the name of the gene involved in the degradation. Updated information on 2,4-D-degrading microorganisms is exhibited on the website.

### 3) *Burkholderia cepacia* complex bacterial database

*Burkholderia cepacia* complex bacteria are versatile microorganisms. They have been reported as pathogens of humans, animals, and plants, and also as biological control agents and bioremediation agents. For these reasons, information on these bacteria is required in various fields, including research, industry and administration, and by consumers. Scientific names, isolate numbers, isolation sources, and functions (including pathogenicity to humans, animals, and plants) are exhibited on the website.

The microbial inventory *microForce* also contains all the microbial databases, such as the Index of Parasitic and Symbiotic Microbes on Wild Plants in Japan, which has been exhibited on the website of the Microbial Systematics Laboratory since 2001, and the Biosafety Level Bacterial Database constructed by the Japanese Society for Bacteriology.

Construction of an English version of *microForce* is in progress. (S. Tsushima, S. Yoshida and H. Shinohara)



Fig. 2 The microbial inventory *microForce*, available on the Web (Japanese version).