

# **RUSSIAN COLLECTION OF AGRICULTURAL MICROORGANISMS (RCAM).**



Head of the collection – Vera I. SAFRONOVA, PhD.

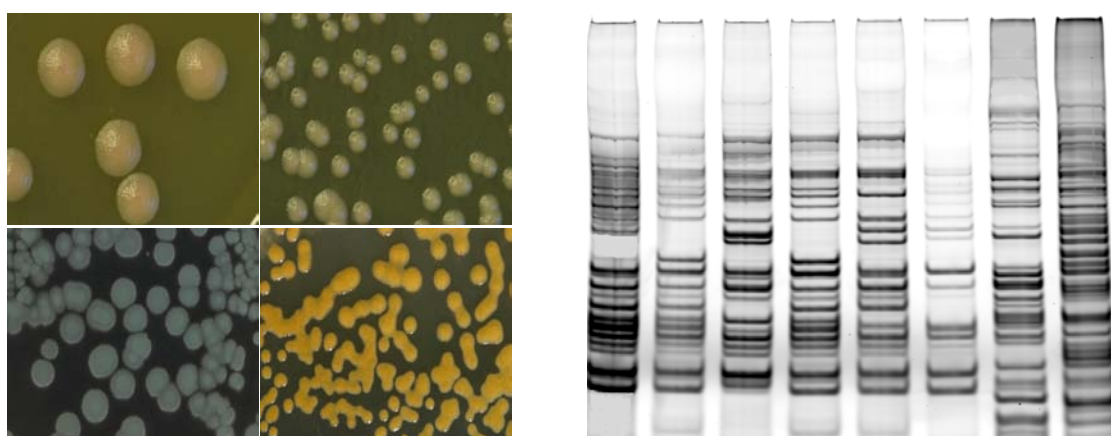
Modern programs of development of biotechnological industry and also different innovative projects are based on various practically-valuable properties of microorganisms. Many of them arise up to due to by high ability of microorganisms to adapt to changing environmental condition. In the natural plant-microbe systems adaptation ability of plant-associated microorganisms play especially important role. However, properties acquired by microorganisms in a specific environment are easily lost during laboratory maintenance. Saving of genetic biodiversity of microorganisms, providing their genetic stability and invariability of useful properties, is an important and not simple task, which it is impossible to decide without the well organized, specialized collections.

Russian collection of agricultural microorganisms at ARRIAM exists from 1891 and is one of the largest microbial collections of Russian Federation. Presently collection counts about 5000 cultures of bacteria, filamentous fungi and yeasts. Collection disposes the unique genetic fund of root nodule bacteria, including 706 cultures – microsymbionts more than 30 leguminous genera, belonging to traditional and non-traditional crops. Collection disposes perspective cultures which can be used for improving of plants growth in normal or

unfavorable environment as well as for accumulation and destruction of ecologically dangerous compounds, contaminating soil and natural reservoirs.

Collection cooperates with the Russian and foreign institutes and participates in international projects, devoted a selection and identification of microorganisms and study of plant-microbe interactions (Italia – Russian collaborative project , ISPAAM-CNR; NATO Collaborative Linkage Grant, University of Waterloo; the Royal Society Joint Project Grant, University of Lancaster).

Collection took part in the International expert council of development of standards of the Biological Resource centers (BRCs) of microorganisms (“*OECD best practice guidelines for biological resource Centres*”, 2007), and also participated in work of Joint OECD/Russian Federation Workshop “Biosecurity of Microbial Biological Resources – Complementing Innovation” (Moscow, 2006) and Workshop of the OECD Sub-working Group on Micro-organisms on the development of a unique identifier for bacteria (Moscow, 2007).



In accordance with modern requirements, the basic method of long-term storage of microorganisms in the collection is cryopreservation, providing the complete stop of cellular metabolism. For a study of taxonomy position of cultures and their molecular-genetic description modern confessedly methods are used: RFLP analysis of gene of 16S rRNA (ARDRA), RFLP analysis of intergenic area of 16S – 23S rDNA (ITS-RFLP), AFLP fingerprinting and also sequencing of ribosomal genes. Fully Integrated Nanoliter Genomic Workstation Parallab 350 is at present available for the sequencing procedures. Parallab offers a fully automated, integrated platform to perform nanoliter volume cycle sequencing,

PCR, SNP and genotyping reactions. The Parallab 350 is comprised of a unique combination of technologies, all working together to deliver high levels of throughput, precision and flexibility. Depending on the protocol and application, the Parallab 350 has a throughput of approximately 1600 samples per 24-hour day that promotes efficiency of molecular-genetic researches in oftentimes.

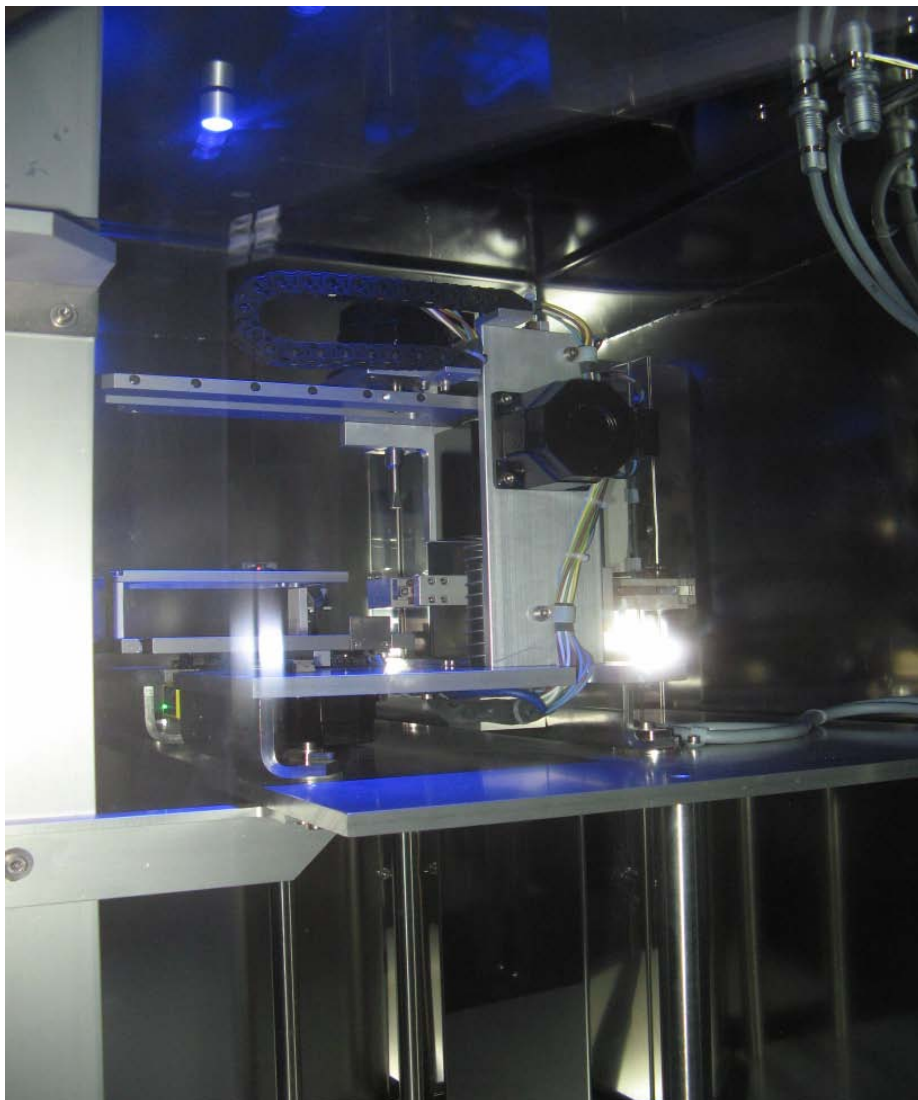
For the last year collection purchased the automated storage system for maintenance of microbial strains at  $-80^{\circ}\text{C}$  (STC Tube Store, Liconic Instruments). Due to drawing on newest developments in area of robotic, computer and cryogenic technologies, the store is provided by the maximally long-term saving of microbial cultures without a loss of their valuable properties. In addition to providing of optimum conditions of storage, unique system allows limiting access to the deposited strains and prevents their unauthorized taking-out. Genetic material (DNA, RNA, plasmids and so on) can be reliably maintained in the depository as well. Such kind of store with a capacity in 200 thousands samples would give the following advantages:

- to intensify the search of new microbial cultures, keeping in mind the huge soil microbes biodiversity and a necessity to mobilize genetic resources of microorganisms for an agricultural production;
- to provide the long-term storage, saving of varied adaptive properties and the authorized access to the cultures of microorganisms, deposited by Russian and European public institutions and commercial organizations;
- to organize the global network of BRCs, i.e. mutually beneficial collaboration of BRCs (both national and international), including co-ordination of activity, exchange by biological material and scientific information.

On a picture the automated STC Tube Store (Liconic Instruments) is represented.



Original appearance of the automated depository of microorganisms.



Automated system, carrying out identification, placing and delivery of tubes.