Original article

DOI 10.24419/LHI.2304-3083.2023.2.06

Conservation of Forest Genetic Resources by the *in vitro* Collection: Status, Prospects, Problems (Analytical Review)

***Oleg M. Korchagin*[1]**
Candidate of Biological Sciences
***Tatiana M. Tabatskaya*[2]**
***Olga S. Mashkina*[3]**
Candidate of Biological Sciences

Abstract. *The paper discusses the possibilities and advantages of use of the in vitro collection for conservation (ex situ) and reproduction of representatives of valuable deciduous woody plants gene pool, and also for the conduct of fundamental and applied scientific research. The paper shows the methodology of creation and long-term (from 1 to 30 years) in vitro storage of a living collection of micro-plants, that includes valuable genotypes of birch, poplar, aspen and willow. It has shown that the use of hormone-free media in long-term storage of samples ensures the preservation of their viability and regenerative capacity, as well as the preservation of genetic traits and breeding characteristics of parent trees (at the stage of transplantation of plants in the soil). The cultivation of planting material which is based on the in vitro collection allows plant breeders to reduce the production costs and the time needed as a result of simplification of the process and exclusion of some individual stages of clonal micro-propagation. It also makes production of high-quality seedlings more efficient and thereby improves efficiency of the creation of purpose-oriented forest plantations through selective replication of genotypes with specified characteristics. The study provides data on the use of the in vitro collection as a genetic resource (species, varieties, subvarieties, hybrids, 21 species and 88 genotypes in total) for researches on cell and tissue in vitro selection with a view to obtaining salt-resistant clones of woody species, for researches on genetics of morphogenesis (in particular, dissected birch leaf). Finally, there is an overview of the problems of interaction between institutions with similar collections. The solution to these problems should improve the availability and relevance of in vitro collections, expand their functions, and ensure rapid implementation of the results into forestry practice.*

Key words: *in vitro clone collection, genetic resources, deciduous woody plants, hormone-free nutrient media, planting material.*

For citation: *Korchagin O., Tabatskaya T., Mashkina O. Conservation of Forest Genetic Resources by the in vitro Collection: Status, Prospects, Problems (Analytical Review). – Text : electronic // Forestry information. 2023. № 2. P. 75–90. DOI 10.24419/LHI.2304-3083.2023.2.06.*

[1] All-Russian Research Institute of Forest Genetics, Breeding and Biotechnology, Director (Voronezh, Russian Federation), omkorchagin@mail.ru

[2] All-Russian Research Institute of Forest Genetics, Breeding and Biotechnology, Senior Researcher (Voronezh, Russian Federation), tatyana.tabacky@gmail.com

[3] Voronezh State University, Associate Professor; All-Russian Research Institute of Forest Genetics, Breeding and Biotechnology, Head of the Laboratory of Biotechnology (Voronezh, Russian Federation), mashkinaos@mail.ru