Institute of Genetics and Cytology
of the National Academy of Sciences of Belarus

Poster ID 151

# DNA Bar-coding Technology in Belarus: Perspectives and Needs\

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☞ **Biological diversity of the Republic of Belarus is represented by 500 animal species and 14 000 plant species, including 4100 of higher plants (1400 aboriginal species), 442 of bryophytes, 669 of lichens and more than 9 000 species of lower pants (algae and fungi). About 50 wild plants of aboriginal species have vanished over the last 100 years. 93,1% of Belarus territory is covered by flora, including 30% of the forest area;**

☞ **There are 50 unique protected areas in Belarus, including 5 National Parks and one Biosphere Preservation supported by UNESCO;**

☞ **Conservation of biological diversity is supported by the Belarus Government. The National Herbarium, the Bank of Plant Genetic Resources, the Republican DNA Bank and other collections are funded from the State budget;**

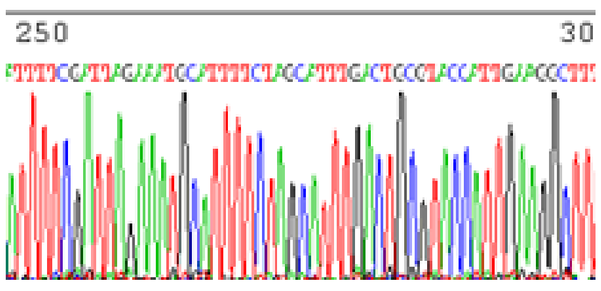
☞ **The Republican DNA Bank is recognized by the Council of Ministers of the Republic of Belarus as National Heritage;**

☞ **DNA-barcoding technique is taken as a basic approach to the species identification and genetic resources' inventory. In Belarus, access to genetic resources is regulated by the Nagoya Protocol to the Convention on Biological Diversity.**

**The Institute of Genetics and Cytology initiated use of a DNA-barcoding technique for taxonomy, including research in rare and endangered species. A plant DNA collection of 35 species (33 species among them belong to rare and endangered species ) was first created at the Republican DNA Bank. The biological material was collected without removal of the whole plant from the places of its growing (two National Parks: Narochansky and Belovezhskaya Puscha ). The list of those species is shown below.**

**To conduct identification of plant genus, species and sub-species taxonomic categories, the following plastid ( *rbcl, matK* and *psbA-trnH*) and nuclear (ITS2) markers were used.**

***Anacaptis morio* (ITS2)**

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TCTCTTGGCAATGGCCGATTAATGGGTGGGATGGAAGCCCCGTTGATTCATCGTCC
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ACAATTGACTGCGACCCCAGGATGGGCGGGATGACCCGCTGAGTTTAAGCATATCA
ATAAGCGGAGGAGAAGAAACTTACGAGGATTCCCCTAGTAACGGCGAGCGAACCGG
GATTTGCCCAGCTTGGGAATCGGGCTGCTTWTGCGGCTCGAATTGTAGTCTGRAGA
AGCGTCA

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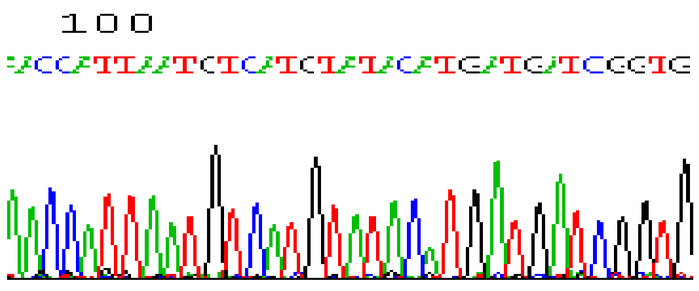
|---|---|---|---|---|---|---|
| Ophrys insectifera voucher NMW6053 5.8S ribosomal RNA gene, partial sequence; internal t | 448 | 448 | 90% | 1e-122 | 85% | KX166535.1 |
| Ophrys insectifera voucher NMW6052 5.8S ribosomal RNA gene, partial sequence; internal t | 448 | 448 | 90% | 1e-122 | 85% | KX166534.1 |
| Anacamptis morio internal transcribed spacer 2 (ITS2) | 433 | 433 | 49% | 3e-118 | 100% | Z94092.1 |
| Anacamptis cf. coriophora AG-2017 voucher AG 2773 small subunit ribosomal RNA gene, pa | 418 | 418 | 68% | 9e-114 | 90% | KU931737.1 |

***Dáphne cneórum* (ITS2)**

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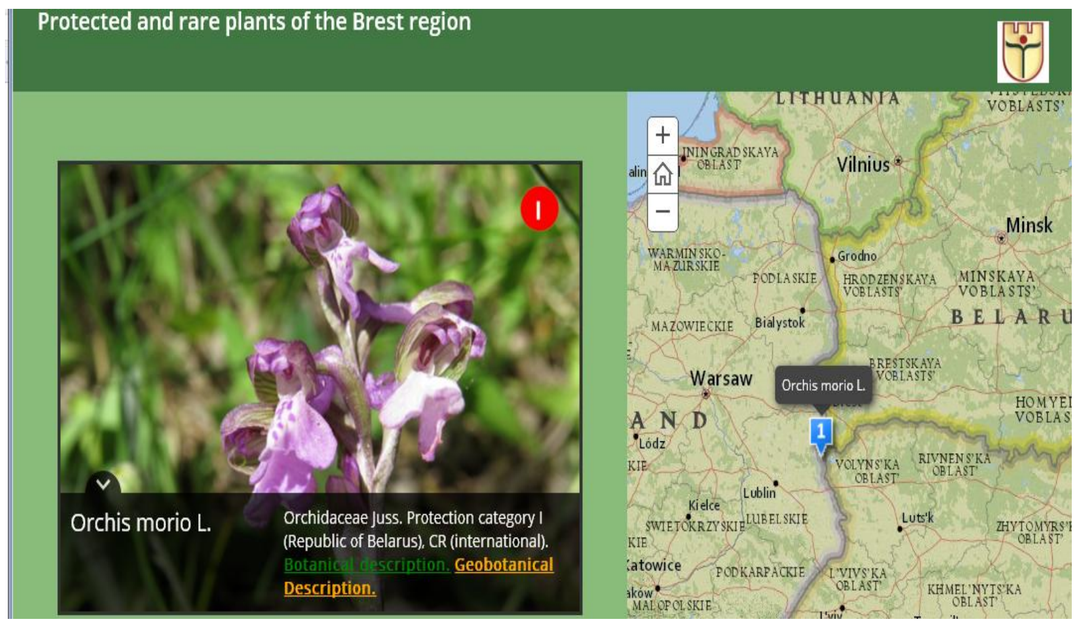
ACTTGGTTGCATTTRTACTTCAAACCTTTGTTTGAAGATAGTATGCATTGCGACCCCAG
GTCATACCCGCTGAGTTTAAGCATATCAATAAGCGGAGGAGAAGAAACTTACGGATTC
CCTTAKGAACGGCGAGCGAACCGGGAATAGCCCAGCTTGAAAATCGGTTGCCTTGGT
TTCCGAATTTGTAGTCKGGAGAARCGTCYACAA

| | | | | | | |
|---|---|---|---|---|---|---|
| Daphne mezereum voucher NMW4372 5.8S ribosomal RNA gene, partial sequence; internal transcribed sp | 643 | 643 | 90% | 0.0 | 99% | KX166606.1 |
| Daphne mezereum voucher NMW259 5.8S ribosomal RNA gene, partial sequence; internal transcribed spa | 643 | 643 | 90% | 0.0 | 99% | KX166420.1 |
| Daphne laureola voucher NMW4371 5.8S ribosomal RNA gene, partial sequence; internal transcribed spac | 496 | 496 | 90% | 3e-137 | 91% | KX166607.1 |

**The DNA-barcoding technique used for the *Dáphne cneórum* plant genome analysis revealed the following mistake made by the taxonomist: the comparison of nucleotide sequences received for the *Dáphne cneórum* sample with the NCBI database resulted in the identification of that sample as Daphne mezerum (see the pictures shown above). We consider that result as evidence that a DNA-barcoding technique should be included in the list of taxonomic tools used for the taxonomic identification of biological objects. Training support in that area for our specialist is very welcome!**




**A cartographic map for rare and endangered plant species has been developed**