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International Union for the Protection of New Varieties of Plants

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WORK ON MOLECULAR TECHNIQUES IN RELATION TO DUS EXAMINATION IN UKRAINE AND SHORT REPORT OF SOFTWARE AND STATISTICAL ANALYSIS METHODS FOR DUS EXAMINATION

Document prepared by an expert from Ukraine

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The annex to this document contains a copy of a presentation “Work on molecular techniques in relation to DUS examination in Ukraine and short report of Software and statistical analysis methods for DUS examination”, to be made by an expert from Ukraine, at the fourth session of the TWM.

[Annex follows]

UKRAINIAN INSTITUTE FOR PLANT VARIETY EXAMINATION

UIPVE

WORK ON MOLECULAR TECHNIQUES IN RELATION TO DUS EXAMINATION IN UKRAINE AND SHORT REPORT OF SOFTWARE AND STATISTICAL ANALYSIS METHODS FOR DUS EXAMINATION

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TWM/4

June 02-05, 2026

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LEGISLATION IN UKRAINE ON PVP IN RELATION TO MOLECULAR TECHNIQUES

Legislation | Convention Notifications | UPOV Convention | Genera and Species Notifications | Full Text Search

Ukraine

Law of Ukraine No. 2763-IX of November 16, 2022

Date of current version: 2023

Dates: Entry into force: June 10, 2023
Promulgated: November 16, 2022

Available Texts

English Law of Ukraine No. 2763-IX of November 16, 2022

WIPO Lex No. UA213

- Current version – Revision on April 19, 2025
https://zakon.rada.gov.ua/laws/show/en/3116-12?lang=uk#Text

- Order of the Ministry of Agrarian Policy and Food of Ukraine "On Approval of the Procedure for Conducting the Qualification Examination of a Variety" dated 05 July 2023 No. 1344

https://zakon.rada.gov.ua/laws/show/en/z1244-23?lang=uk#Text

- All DUS test guidelines are approved by the National authority – the Ministry of economics, environment and agriculture of Ukraine

- **There are no established provisions** *specifying when and under what conditions biochemical and molecular methods may be applied.*
- **There are no defined procedures** *for the use of official variety collection samples in the application of biochemical and molecular methods.*

- **Section II, paragraph 11:**
For the purpose of establishing DUS, the Examination Office may apply additional biochemical and molecular methods of identification, ***subject to the agreement of the applicant.***

- Only one DUS test guideline contained the procedure which includes molecular methods – identification CMS (Cytoplasmic male sterility) in maize

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R&D Projects of Ukrainian Institute for Plant Variety Examination (UIPVE) on Molecular Marker Techniques

- Development of a System for Evaluating Quality Indicators of Cereal and Oilseed Crop Varieties (2025-2029)
- Development and Software Implementation of a System for the Evaluation of Plant Varieties Using SSR Markers within the Framework of DUS Testing (2020-2024)
- Improvement of the DNA Typing System for Agricultural Crop Varieties Based on Molecular Genetic Markers (2017-2018)
- Development of a Genotyping and Variety Passporting (Identification) System for Soybean (*Glycine max* (L.) Merr.) Based on Molecular Genetic Markers Using PCR Methods (2010)
- Development of a Database for Agricultural Crops Based on Molecular Genetic Markers and Technological Traits, Using Self-Pollinated and Cross-Pollinated Crops as Case Studies (2008)
- Development and introduction of DNA - technologies for the differentiation and identification of plant varieties (2005-2007)

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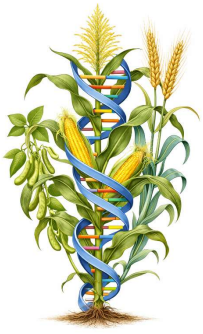
THE UTILIZATION OF MOLECULAR TECHNIQUES IN UKRAINE FOR DUS TESTS

- The molecular marker technique is used **on occasional basis**

Crop	Method	Purpose of use
Maize	DNA markers for CMS type identification	Distinctness
Maize	Electrophoresis of storage proteins	Identity, purity
Wheat	Electrophoresis of storage proteins	Identity, purity
Soybean	SSR markers	Identity



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OTHER APPLICATIONS OF MOLECULAR TECHNIQUES IN UKRAINE

For variety identification

Crops:

- ❑ Maize (electrophoresis of storage proteins)
- ❑ Sunflower (electrophoresis of storage proteins)
- ❑ Barley (electrophoresis of storage proteins)
- ❑ Wheat (electrophoresis of storage proteins)
- ❑ Soybean (SSR markers)

For enforcement

Crops:

- ❑ Maize (SSR markers)
- ❑ Sunflower (SSR markers)

- to requests from the police and the prosecutor's office

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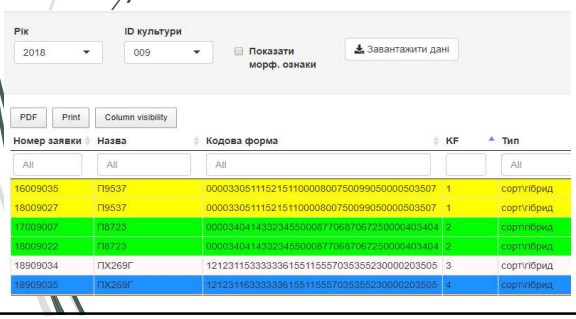
SOFTWARE FOR DUS EXAMINATION AND DATA PROCESSING

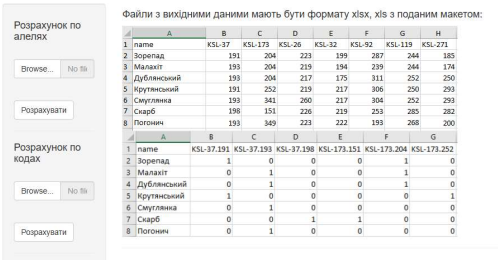
The software system of UIPVE integrates a data analytics platform based on the R and Shiny ecosystem and includes the following modules:

- Seed Supply module
- Official Sample Storage (long-term storage) module
- Data Collection and Processing module for DUS examination at testing sites
- Post-control module

Analysis of candidate varieties for distinctness



Allele conversion and calculation of molecular distances (ROG)



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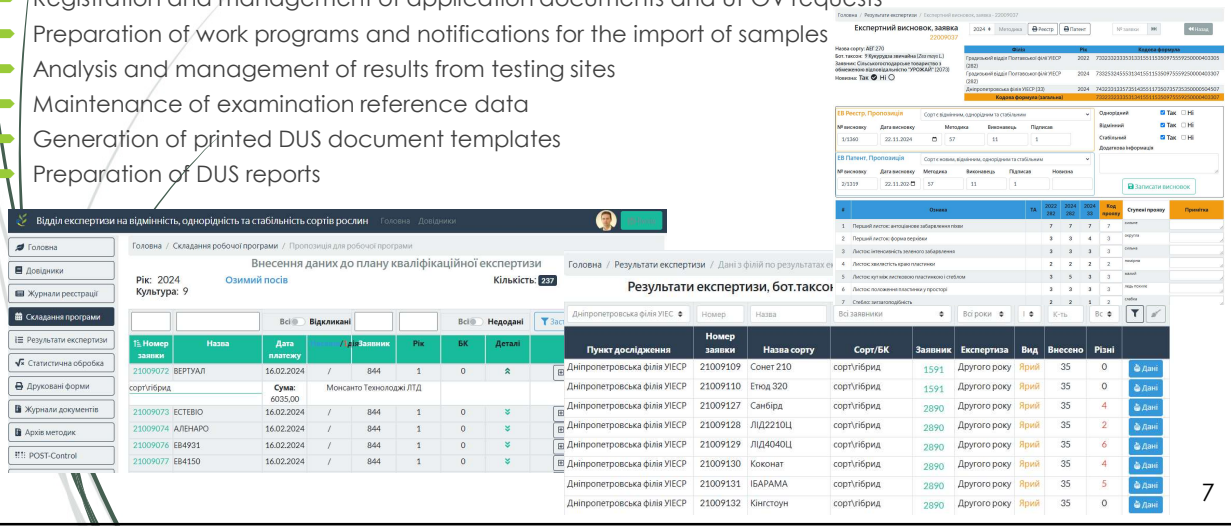
Software application of DUS Department

The software application developed on the ASP.NET Core platform. This application provides the following functions:

- Registration and management of application documents and UPOV requests
- Preparation of work programs and notifications for the import of samples
- Analysis and management of results from testing sites
- Maintenance of examination reference data
- Generation of printed DUS document templates
- Preparation of DUS reports



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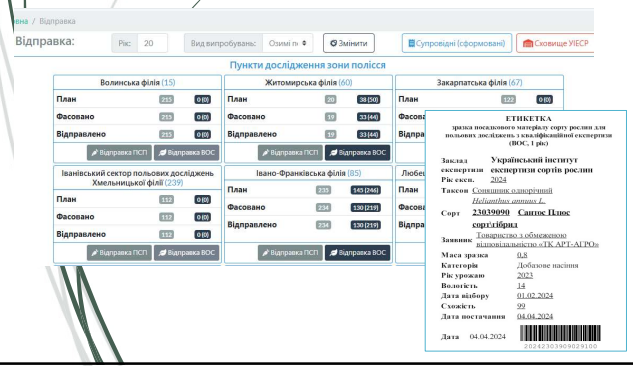
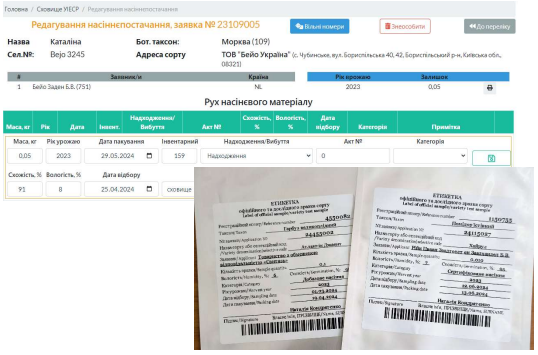
Seed Supply module

- The module ensures the registration of incoming experimental seed samples at the a designated affiliate of UIPVE, the distribution (packaging) of samples, and the generation of accompanying labels for dispatch to the storage facility or testing site, including a generated barcode.



Official Sample Storage module

- The module automates the movement and updating of official seed samples stored in the long-term storage facility of UIPVE. For each sample, a label is generated. The label includes a barcode containing the identifier of the seed sample, enabling quick access to the variety record.



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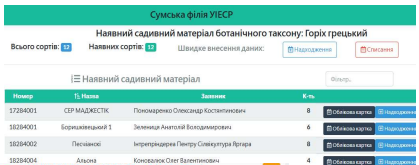
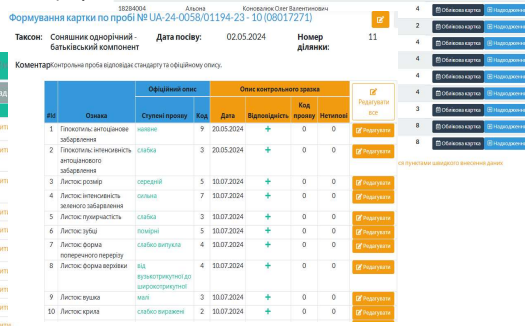
DATA COLLECTION MODULE FOR DUS EXAMINATION AT TESTING SITES

The module ensures the online transmission of results from DUS examination from testing sites:

- Statistical processing of quantitative characteristics;
- Sample updates;
- Results for DUS characteristics;
- Accounting of planting material (collections of perennial crops)





MAIN CHALLENGES AND ONGOING PROJECTS

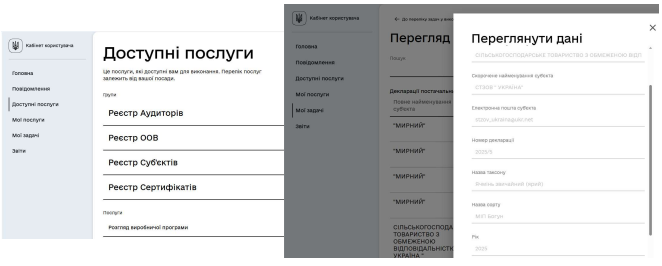
USING MOLECULAR TECHNIQUES

- Increase trust in the use of molecular markers in Ukraine by ensuring transparent and secure procedures for breeders
- Revise the fee structure for DUS technical examination to incorporate the costs associated with the application of biochemical and molecular methods
- Establish clear regulatory provisions governing the use of biochemical and molecular methods in DUS testing

ONGOING PROJECTS

The electronic system of registers in the field of crop production, e-Crop Production is being tested.

The system includes a Variety Database, which consists of interconnected electronic registers: Register of Applications; State Register of Plant Varieties Suitable for Dissemination in Ukraine; State Register of Plant Variety Patents; Register of Seed Production and Nursery Operators; Register of Certification Auditors (Agronomist-Inspectors); Register of Certificates for Seeds and/or Planting Material; Register of Conformity Assessment Bodies



THANK YOU FOR ATTENTION!

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[End of Annex and of document]