

DELIVERABLE 2.2

SURVEY ON MICROBIAL CULTURE COLLECTIONS



Project SUS-MIRRI.IT

“Strengthening the MIRRI Italian Research Infrastructure for Sustainable Bioscience and Bioeconomy”
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Work Package involved: WP2

Deliverable: D2.2 Report on the second survey on microbial culture collections administered by WP2 (Bimester 21).

Period: March - April 2026 (Bimester 21; M42)

Description: This document reports the elaboration of the second survey administered by WP2 within of the SUS-MIRRI.IT project.

Indicator: 2.2 - At least 1 survey on assessment on quality improvement of bioresources preservation and management with 90% of questionnaires filled and elaborated received from the CCs

A survey has been created using a Google format for monitoring the amount of resources available and the characteristics of the collection (quality, organization and services). The questionnaire (file attached as annex) has been distributed among the OUs of the project using a Google format for monitoring the improvement of the quality management system reached by each CCs/mBRCs. The questionnaires received have been elaborated in a report (M42).

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1. Introduction and scope of the deliverable

This document constitutes Deliverable D2.2 and reports the extended elaboration and critical discussion of the results of the second questionnaire administered within WP2 of the SUS-MIRRI.IT project. The deliverable aims to provide a comprehensive and analytically robust overview of the current status, progress, and remaining challenges of the Italian MIRRI network.

The questionnaire was designed to assess organisational maturity, quality management, biosafety and biosecurity, legal compliance, conservation strategies, digitalisation, service provision, and strategic perspectives of the participating culture collections. Quantitative indicators were complemented by qualitative feedback, allowing both measurement of progress and identification of critical issues requiring further intervention.

2. Participation and representativeness

The second WP2 questionnaire was completed by 21 culture collections (UO10 completed a single questionnaire on behalf of three ENEA collections), covering the full spectrum of microbial resources managed within MIRRI-IT, including bacteria, yeasts, filamentous fungi, algae, cyanobacteria, and viruses. All responding collections are clearly identified by acronyms and scientific specialisation, indicating a high level of organisational definition and traceability. The 100% response rate among active WP2 units confirms the consolidation of the national network and demonstrates a strong level of engagement with WP2 activities. From a strategic perspective, this broad participation ensures that the results are representative of the MIRRI-IT network and can be reliably used to support decision-making, prioritisation of actions, and evaluation of project impact.

Regarding international recognition, 10 out of 21 collections are registered in the World Federation for Culture Collections (WFCC), of which 9 are also members of ECCO. The remaining collections have either initiated internal discussions or expressed interest in future registration, highlighting a positive trend towards international alignment, although further support may be needed to facilitate accession for all units.

3. Governance and internal organisation

The questionnaire highlights a heterogeneous but overall improving situation concerning governance and internal organisation. Only 2 collections currently operate under a fully adopted internal regulation, while 15 collections are in the process of drafting or formally adopting internal rules, and 4 collections still lack a formalised regulatory framework. This indicates that governance consolidation is ongoing but not yet complete across the MIRRI-IT infrastructure.

A similar pattern is observed for organisational structures. An organisational chart is already implemented in 10 collections, while another 10 are in the phase of implementation or operational deployment; 1 collection does not yet have a defined organisational chart. These results underscore the positive impact of WP2 guidance, while also pointing to the need for continued support, particularly for smaller or less structured units.

The progressive formalisation of governance instruments is a prerequisite for long-term sustainability, accountability, and alignment with international standards, and remains a key objective for the next implementation phase.

4. Quality Management System and Certifications

Quality management represents one of the most advanced and consolidated areas within WP2. Nineteen out of 21 collections have fully adopted the SUS-MIRRI Quality Management System, while the remaining two collections are in the final acquisition phase. This high level of adoption demonstrates the effectiveness of the harmonised QMS approach promoted within the project.

In terms of external certifications:

- 6 collections hold ISO 9001 certification;
- 2 collections apply the EVA (European Validation of microbial and viral collections) standard;
- 1 collection reports the application of OECD-related standards.

Internal audits and friendly audits emerged from qualitative feedback as particularly valuable tools, not only for compliance verification but also for capacity building, knowledge exchange, and continuous improvement. Several respondents explicitly reported audit activities as instrumental in identifying gaps and supporting progress towards advanced standards such as ISO 20387.

5. Biosafety and Biosecurity

All 21 participating collections declared the presence of personnel trained in biosafety and biosecurity, confirming that these aspects are widely recognised as essential components of professional collection management.

With regard to containment levels, 8 collections operate at BSL-1, while 13 collections operate at BSL-2. This distribution reflects the diversity of managed biological materials and the increasing implementation of structured safety systems.

Access regulation is in place in 19 collections, with 1 collection still completing the acquisition process and 1 collection lacking formal access control procedures. Although the overall situation is largely satisfactory, the absence of access regulation in even a small number of units represents a risk that must be addressed.

The management of regulated microorganisms is reported as follows: 4 collections handle genetically modified organisms (GMOs), 3 manage quarantine organisms, and 2 deal with materials classified as dual-use. This emphasises the importance of maintaining high biosafety and biosecurity standards and of providing continuous, updated training programmes.

Feedback from respondents reveals a strong demand for periodic refresher courses and updates, confirming that biosafety training should be considered a continuous process rather than a one-off activity.

6. Legal compliance: Nagoya Protocol, MTA and MDA

Compliance with legal and regulatory frameworks appears as one of the strongest achievements of WP2. All 21 collections declared full compliance with the Nagoya Protocol and ABS requirements, reflecting the effectiveness of coordinated actions at the national level.

The adoption of standardised legal instruments is well advanced:

14 collections already use the new MDA, while 5 plan adoption by the end of the project; 1 collection does not intend to adopt it.

For MTA, 15 collections already apply the new model, and the remaining collections plan adoption within the project timeframe, with one exception limited to internal use.

Reported criticalities mainly concern long approval processes by institutional legal offices, which can delay implementation despite technical readiness. This highlights the need for stronger interaction between scientific units and legal/administrative structures.

7. Preservation strategies and disaster recovery

Preservation and risk mitigation remain an area of significant progress but also of residual criticality. Seventeen collections (81%) have implemented conservation systems compliant with MIRRI standards, confirming a solid baseline level.

However, only 10 collections (48%) preserve more than 60% of the strains using at least two conservation methods, while this percentage further decreases to 7 collections (33%) for newly acquired strains. The latter result is mainly attributed to delays in the implementation of lyophilisation and other complementary techniques.

A disaster recovery plan at a secondary site is in place in 9 collections (43%). Of these, 2 are fully operational, while the remaining collections report partial implementation levels between 30% and 50%. These data clearly indicate that disaster recovery represents a strategic priority for the next operational phase.

8. Microbial resources, authentication and genomics

The questionnaire allowed a quantitative assessment of the microbial resources managed within the federation. Overall, collections reported 7,902 newly acquired strains, 10,341 historical strains authenticated, and 1,252 genomes sequenced. The distribution across categories highlights particularly strong activities in bacteria, filamentous fungi, and yeasts, as well as a growing integration of genomic characterisation. These results confirm the scientific relevance of MIRRI-IT collections and their increasing added value in terms of quality and data richness.

9. Digitalisation and Data Management

Digitalisation is one of the most homogeneous and successful areas across the federation. All 21 collections have uploaded their data to the National Catalogue, contributing a total of 39,162 strains.

In addition, 13 collections maintain a public website, enhancing visibility and accessibility, while 12 collections actively use the software developed within SUS-MIRRI.IT. Qualitative feedback emphasises the usefulness of the standalone version of the software, particularly for local data management and interoperability.

10. Services and Distribution

Service provision and strain distribution activities demonstrate a growing interaction with external users. Specifically:

- 7 collections distributed strains against payment (125 strains);

- 18 collections distributed strains free of charge, with an average of approximately 660 strains per year;

- 12 collections provided paid services, for a total of 426 services, including safe deposit, identification, isolation and distribution.

Strain distribution is mainly addressed to universities and public research institutions (70–100%), while the private sector currently represents a smaller but potentially expandable user base.

11. Strategic Feedback and Overall Assessment

The extended analysis of questionnaire results confirms the major strategic value of MIRRI-IT, perceived by participants as a highly effective and, in several aspects, unique organisational model at the European level.

Key strengths include harmonisation of procedures and legal documents, significant advances in quality management, effective WP2 coordination, and the growth of technical and regulatory competences through training and collaboration.

At the same time, recurrent critical issues were identified, notably the slowness of administrative procedures, insufficient dedicated technical staff, the need for continuous training, and concerns about long-term financial sustainability after the end of extraordinary funding.

Overall, the results demonstrate that WP2 has achieved substantial and measurable progress in strengthening the Italian MIRRI infrastructure, while clearly identifying priority areas for consolidation and future development.