



Digital tool for the notification, traceability of OHM seed

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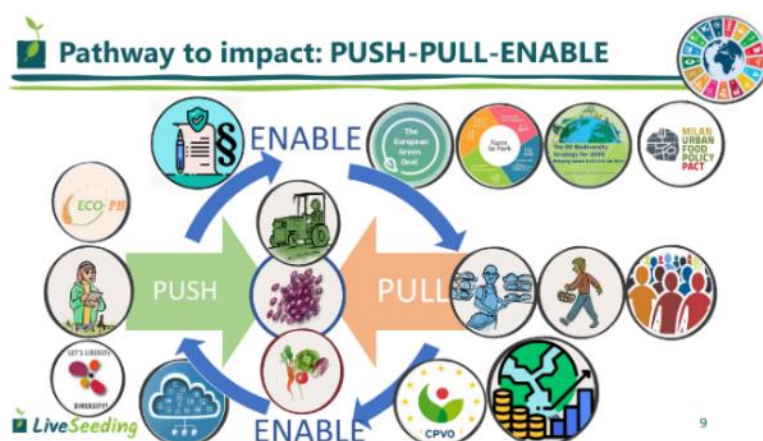
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LiveSeeding - Organic seed and plant breeding to accelerate sustainable and diverse food systems in Europe is a 4-year Innovation Action funded by the European Union, the Swiss State Secretariat for Education, Research and Innovation (SERI) and UK Research and Innovation (UKRI). The project started in October 2022 and brings together 37 organisations operating in 16 European countries. LiveSeeding provides science-based evidence and best practice solutions to help achieve 100 % organic seed.

LiveSeeding contributes to the transition towards environmentally-friendly, climate-neutral, healthy and fair food systems through a **PUSH-PULL-ENABLE strategy** to

- ❑ enhance the availability and adequacy of organic seeds of cultivars appropriate to organic farming (PUSH),
- ❑ increase and stabilise the market demand for organic seeds of cultivars appropriate to organic farming (PULL),
- ❑ foster an enabling policy and regulatory environment where both demand and supply can harmoniously and productively negotiate without irrelevant constraints due to legal restrictions and/or regulatory fragmentation (ENABLE).

LiveSeeding addresses the topics in a **holistic multi-actor, multi-stakeholder,**



participatory approach involving stakeholders along the value chain in 17 local **Living Labs** (LLs) and 3 established networks of organic breeders (**ECO-PB**), seed savers (**ECLLD**) and Milan Urban Food Policy Pact (**MUFPP**). 15 European countries cover the different pedoclimatic zones and socio-economic contexts, including countries with a low level of development in organic seed and breeding in East and South Europe.

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List of abbreviations

AGM	Annual General Meeting
API	Application Program Interface
BrAPI	Breeding Application Program Interface
BRAVA	Breeding API Validator
BSA	Bundessortenamt
CAP	Common Agricultural Policy
CPVO	Community Plant Variety Office
DB	Database
EU	European Union
INRAE	Institut National de la Recherche Agronomique (French National Research Institute for Agriculture, Food and Environment)
JSON	JavaScript Object Notification
LPIS	Land Parcel Identification System
OAuth	Open Authorization
OHM	Organic Heterogeneous Material
PRM	Plant Reproductive Material
SHiNeMaS	Seeds History and Network Management System
UI	User Interface
UK	United Kingdom
UPOV	International Union for the Protection of New Varieties of Plants
UX	User Experience

Summary

This deliverable introduces OHMTrack, a digital tool developed within the LiveSeeding project to manage the notification and traceability of Organic Heterogeneous Material (OHM).

OHMTrack is an open-source platform designed to help breeders, seed producers and traders to notify, track and identify OHM, particularly benefiting small organic enterprises. Developed through a co-creation approach with key stakeholders, OHMTrack provides a user-friendly solution to challenges faced by similar tools. It is designed for interoperability, integrating with systems like SHiNeMaS, SeedLinked, and the EU-wide router database, ensuring efficient data exchange and full traceability. The platform complies with EU regulations and BrAPI standards to improve OHM management accessibility.

The deliverable is structured to cover the platform's objectives, methodology, technical infrastructure, and user manual.

It is important to note that in the present deliverable the term "seed" is used informally to refer to the actual plant reproductive material related to an OHM, serving as a proxy for the term "Plant Reproductive Material (PRM).

1. Introduction

This deliverable presents OHMTrack, a digital platform developed within the LiveSeeding project to manage the traceability of OHM (Organic Heterogeneous Material) seed lots.

The LiveSeeding project promotes digitalisation as a key driver for ecological transition and sustainable growth, with a particular focus on strengthening collective capacity to manage diversity.

In this context, OHMTrack has been developed as an open-source platform to support breeders, seed producers and traders in managing the notification, traceability and identification of OHM.

With its user-friendly interface, OHMTrack addresses the challenges that have limited the adoption of similar solutions, offering a practical platform particularly suited to small organic enterprises. Its development has been guided by a co-creation approach, involving key stakeholders to ensure the platform meets the actual needs of its users.

To enhance compatibility with existing systems, OHMTrack has been built with interoperability in mind, enabling integration with tools such as SHiNeMaS¹, SeedLinked², and the EU-wide router database³. This facilitates efficient data exchange and supports full traceability across all stages of OHM production, preparation, and distribution following their notification.

OHMTrack is fully compliant with the European Commission Delegated Regulation (EU) 2021/1189 and adheres to the BrAPI standards, aligning with regulatory requirements while also improving accessibility of OHM management (European Commission 2021).

The document is structured as follows:

- *Section 1 outlines the issues that OHMTrack aims to address and describes its intended users.*
- *Section 2 presents the methodology, focusing on the entities managed by OHMTrack, the requirements for notification and traceability processes, and the co-design approach adopted during development.*
- *Section 3 details the technical infrastructure, in particular the database structure which is based on the SHINEMAS framework and the development of the API interfaces.*
- *Section 4 provides the user manual, offering guidance on how to effectively use the different functionalities of OHMTrack.*

¹ Oliveria *et al.* 2020; <https://www.fao.org/plant-treaty/tools/toolbox-for-sustainable-use/details/en/c/1366939>

² Riar *et al.* 2023; <https://seedlinked.com>

³ Gutzen, Kaja 2024; <https://liveseeding.eu/eu-organic-seed-database>

1.1 Key objectives and challenges addressed by OHMTrack

OHMTrack has been developed to tackle critical issues in the management of OHM, with two primary objectives:

- supporting the OHM notification process to ensure accurate and organised documentation;
- facilitate the OHM traceability to support breeders, seed producers, traders, and authorities in tracking OHM exchanges across different organisations.

One of the main obstacles in OHM management is the lack of reliable digital tools for traceability and identification. This gap particularly affects small organic enterprises, who often struggle to manage documentation and trace the origins of genetic material. Moreover, existing digital solutions for OHM-related activities and regulatory compliance frequently lack interoperability, limiting their integration with established platforms like SHiNeMaS and SeedLinked.

1.2 OHMTrack users

OHMTrack functionalities are designed to meet the needs of a range of users, each with distinct roles and interests. These include:

- *Notifiers*
- *Breeders*
- *Producers of OHM plant reproductive material/seed lots*
- *Seed Certification Agencies and Plant Variety Offices*

Notifiers provide data and notify OHM in the sense of the Delegated Regulation (EU) 2021/1189. Their role involves submitting accurate information about the OHM (e.g., description, breeding methods, origin, trial data) ensuring the correct documentation is provided. They can update details and monitor the status of their submissions.

Breeders can use OHMTrack to monitor producers of OHM seed lots and to facilitate the breeding and, if applicable, the notification processes. However, record-keeping for breeding activities is out of scope for OHMTrack. For this purpose, SHiNeMaS developed by INRAE, is the recommended tool to track all breeding activities.

Producers of OHM plant reproductive material/seed lots produce and manage OHM seed lots. They use OHMTrack to document the origin and traceability of their seed lots. Producers can create, modify, and update seed lot information, as well as track the movement and reproduction of their seed lots. In this deliverable seeds/seed lot is used instead of the legally more precise term plant reproductive material (see also section 2.1).

Seed Certification Agencies (if they have been designated as the competent authority in accordance with Art. 9 of the Delegated Regulation (EU) 2021/1189) ensure that seed lots meet

regulatory and quality standards. They may use the platform to review, validate, and approve the documentation and traceability of seed lots submitted by producers. Their role may also include overseeing compliance and issuing risk based (post marketing) control based on the data entered in the system.

2. Methodology

2.1 Identification of the main entities

The design of OHMTrack started with the definition of the key entities managed within the system.

A few general remarks:

- this deliverable does not aim to provide strict formal and legal definitions of these entities; the aim of this section is rather to present a practical list of terms adopted to create the OHMTrack database structure;
- in the text, **the term "seed" is used informally to refer to the actual plant reproductive material related to an OHM, serving as a proxy for the term "Plant Reproductive Material (PRM)".**

For each entity, a brief description is provided below, along with details on related interoperability mechanisms. Since no standardized definitions currently exist for these entities, the LiveSeeding project partners have agreed on the following descriptions:

- **Crop/species:** OHMTrack adopts the crop list defined by UPOV (<https://www.upov.int/genie/species.xhtml>) and CPVO. To ensure compatibility with external systems, the UPOV code is used (e.g., [TRITI](#) for *Triticum* L. or [TRITI AES](#) for *Triticum aestivum* L., and [TRITI AES AES](#) for *Triticum aestivum* L. subsp. *aestivum*). If users cannot find the exact crop name when registering germplasm, they are advised to select the closest (and most precise) option available. The administrator can expand the crop list if needed;
- **Cultivar:** OHMTrack manages a list of denominations used to describe a genetically diverse OHM (e.g., the OHM Evoldur) or a homogeneous variety (e.g., variety Senatore). For OHM, the administrator has a dedicated function to maintain a list of the notified OHMs. Before notification of the OHM, users can create their own denomination to begin collecting data;
- **Germplasm:** in OHMTrack, germplasm refers to a collection of seed lots from a single cultivar, which are grouped together according to specific criteria, e.g., to the geographic region where they are multiplied (Figure 1);
- **Seed lot:** refers to a quantity of seed (or more generally plant reproductive material) belonging to one germplasm, with a single owner in one location;

- Seed lot pedigree:** describes the relationship between seed lots, with the following possible connections:
 - diffusion: when a part or all of a seed lot is transferred to a different location and/or owner (e.g., distributing seeds to a farmer or breeder);
 - reproduction: when seeds are sown and harvested;
- Notification:** a descriptive dossier of a new OHM cultivar is sent to the competent national authority. After three months, provided that no additional information was requested nor a formal refusal was communicated, the authority is deemed to have acknowledged the notification of the OHM.

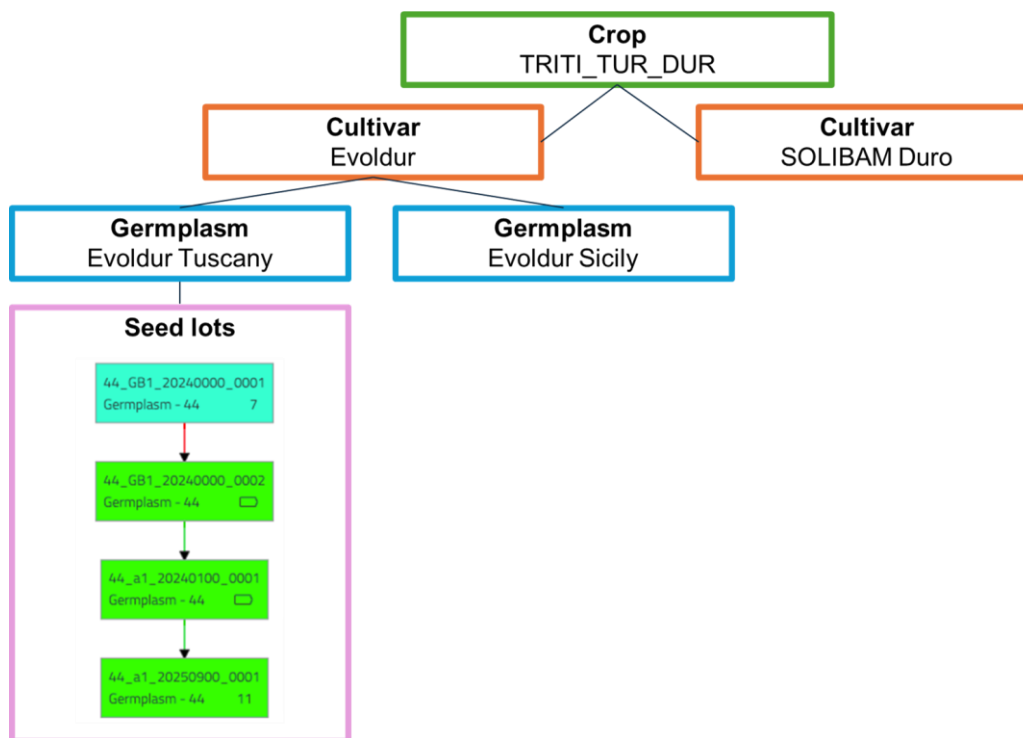


Figure 1 Example of the relationship between crop, cultivar, germplasm and seed lots

2.2 Notification and traceability requirements

A comparison of the current notification procedures approved by (or in the process of being approved by) national authorities in France, Italy, Germany and the UK is shown in Table 1.

Table 1 Comparison of notification procedures in France, Italy, Germany, and the UK, with indication of the competent authorities responsible for the process as well as the type and status of the procedure

Country	Competent Authority	Procedure: type and status
France	Geves	Document submission

Italy	CREA	Draft (not publicly available)
Germany	Bundessortenamt (BSA)	Online procedures and document submission
UK	Animal & Plant Health Agency	Document submission

A set of common items in the notification forms of the different countries was identified and used to determine the data entry form for OHMTrack. The adopted structure allows each country to customize data entry, but along with country-specific requirements it is suggested to adopt a common structure of the notification forms.

In Figure 2, a list of the common fields of the notification forms is shown. Inputs not required by one country are highlighted in red.

	DE	IT	FR	UK
Species	Species	Species (botanical and common)	Species	Species and varieties used to create population
Denomination	Name of the organic heterogeneous material	Denomination of OHM	Proposed name	Name of population (or proposed name)
Notifier Name	Notifying person or company/other name	Name of the applicants with Fiscal Identification Code	Name of the applicant	Name and address of applicant (where the applicant is not an individual, the person responsible for participation in the experiment)
Address	Address, Address Number	Address	Address	Address
Phone	Long distance call		Telephone	Telephone
Email	Email		Email	Email

Maintainer (if different)		Name of the operators that maintain the OHM		Name and address of the person responsible for the breeding, production and maintenance
Parental	Description of the parent material , if applicable, indicate the varieties or genotypes used to create the organic heterogeneous material	Parental description	Parental description	Species and varieties used to create population
Breeding scheme	Breeding scheme	Adopted methods	Description of the method	* Objectives of the breeding programme * Description of the type of technique used to generate the population, including the breeding scheme
Country / Locations	Country of breeding or production, indication of region if applicable	Location where the OHM has been bred	Site	Region or proposed region of production
Pedo-climatic conditions	Description of soil and climate conditions	Description of soil and climate conditions	Site and Description of soil and climate conditions	
Phenotypic characterization	Phenotypic characterization of essential features common to the materia	Phenotypic characterization	Phenotypic characterization, common traits and level of heterogeneity	Description of the population's characteristics, including — whether it is self pollinating (ii); disease resistance (vi), taste or colour; and (viii) any other characteristic which the applicant regards as relevant (vii). * Results of any experimental trials concerning the characteristics specified, outlined in the previous section

Heterogeneity	Degree of heterogeneity	Define the level of homogeneity for a character (if homogeneous) or, if possible, the level of variation for heterogeneous characters.		The degree of heterogeneity (i);
Agronomic value	Documentation of relevant traits including agronomic aspects (e.g. yield, yield stability, suitability for extensive management, direction of use, performance, resistance to abiotic stress, disease resistance, quality, taste or colour)	Agronomic value (7) Use value (8)	Agronomic and use value	Yield, yield stability and quality (iii); performance (iv);
Organic or Low input growing condition			Favorable conditions for cultivation and use (not mandatory)	Usability in low-input agriculture (v);

Figure 2 Fields of the notification forms in Germany (DE), Italy (IT), France (FR), and the United Kingdom (UK). Cells highlighted in red indicate fields that are not required in that country

Along with the common fields and features, there are some country-specific requirements that have not yet been included in the original lists but can be added later.

The custom fields from Germany include the:

- Designation and identification number (if the OHM candidate was already approved under Commission Implementing Decision (EU) 2014/150 on a temporary experiment on the “marketing of populations of the plant species wheat, barley, oats and maize”; (European Commission 2014));
- Trademark at the German Patent Office (if available);
- Description of own production protocol program or on-farm management and selection practices;
- Indication of the year of production.

An example of a custom field from the UK is:

- Quantity of seed intended to be marketed during the period of participation in the experiment.

2.3 Co-design approach

This paragraph describes the co-design methodology adopted, highlighting key events and workshops, along with examples of requested features.

The development of OHMTrack followed a co-design methodology, ensuring active participation from key stakeholders throughout the process. The approach focused on

integrating insights and needs of users into the development of the tool, guaranteeing that it effectively addressed the functional requirements of the user groups.

The **initial phase** focused on defining user groups, the identification of functional requirements, and an analysis of existing data registration formats used in Germany, Italy and France.

As part of Task 9.3 of the project, the interoperability of OHMTrack with other LiveSeeding digital tools (SHiNeMaS and SeedLinked) was evaluated to explore potential integrations. OHMTrack adopts the SHiNeMaS data structure, with dedicated user interfaces tailored to meet its specific needs.

A series of traceability workshops was organised by ÖMKi and AEDIT to gather insights from different user groups:

- 7 July 2023 - to collect feedback from competent authorities on the OHMTrack demo version and refine its features based on user needs;
- 14 September 2023 - to gather feedback from breeders regarding the demo version of the OHMTrack tool and to discuss the requirements and potential improvements.

Following these interactions, the **alpha version** of OHMTrack has been published and presented at the LiveSeeding AGM 2023 in Poznań – Poland (25-29 September 2023), showcasing the tool to a wider audience.

On 6 February 2024, a plenary online meeting with WP1, WP2 and WP3, was held to synchronize development efforts and present newly implemented functionalities. On 29 April 2024, OHMTrack was introduced during the 3rd Live Seeding OHM Webinar and Workshop, where internal partners were invited to test the tool and share their observations. Some users actively participated in testing, leading to a series of requests for improvements, including: (i) bug fixes and updates in terminology, (ii) enhancements to germplasm and seed lot management such as the ability to delete incorrect entries, improved data for seed origin identification, and refinements in user UI/UX, (iii) integration of codes adopted by the Land Parcel Identification System (LPIS) used for the Common Agricultural Policy (CAP), where available, to better identify farms and fields.

The request issues were processed, and corresponding updates were implemented in OHMTrack.

On 22 November 2024, an internal workshop was held to outline a methodology for OHM traceability. The key objectives were to:

- Define traceability methodologies, including procedures and registers;
- Establish minimum data requirements
- Ensure alignment with digital solutions, fully integrating OHMTrack;
- Develop a cross-checking approach with procedures and authorities.

The **co-design process is ongoing**, with continued input from stakeholders guiding further improvements to ensure OHMTrack remains aligned with user needs.

3. Technical infrastructure

3.1 DB structure (SHiNeMaS)

The database (DB) entity-relationship structure is based on the relational model of SHiNeMaS, which already provides a suitable framework to track the necessary entities. To meet OHMTrack specific requirements, some adaptations of the structure were made, by updating the Django data model and generating the related Python migrations files. These updates modified the SHiNeMaS DB structure to include additional tables and fields required by OHMTrack.

The user interface of OHMTrack is designed specifically for traceability purposes, while ensuring full compatibility with other SHiNeMaS instances at the DB level.

In Figure 3, the entity-relationship diagram of OHMTrack is shown. Entities added to the original SHiNeMaS structure are highlighted in green and include the:

- **Organisation** - this entity allows the management of the same instances of data belonging to different organisations. Both location and germplasm are linked to the organisation, enabling users to keep their data private;
- **Cultivar** - this entity allows users to keep several germplasms under the same cultivar name. Cultivar can be used to track of OHMs or varieties, maintaining a set of germplasms under the same denomination for an OHM (e.g., germplasm derived from an original OHM adapted to specific pedoclimatic conditions);
- **Notifications** - this entity is used to manage the OHM notifications, linked to a specific country.

The SHiNeMaS tables that have been expanded with additional fields to support traceability data are marked in yellow in figure 3. The SHiNeMaS tables used without modifications are marked in white in figure 3.

Activities have already been set up to review the DB modifications and better harmonize the SHiNeMaS and OHMTrack systems.

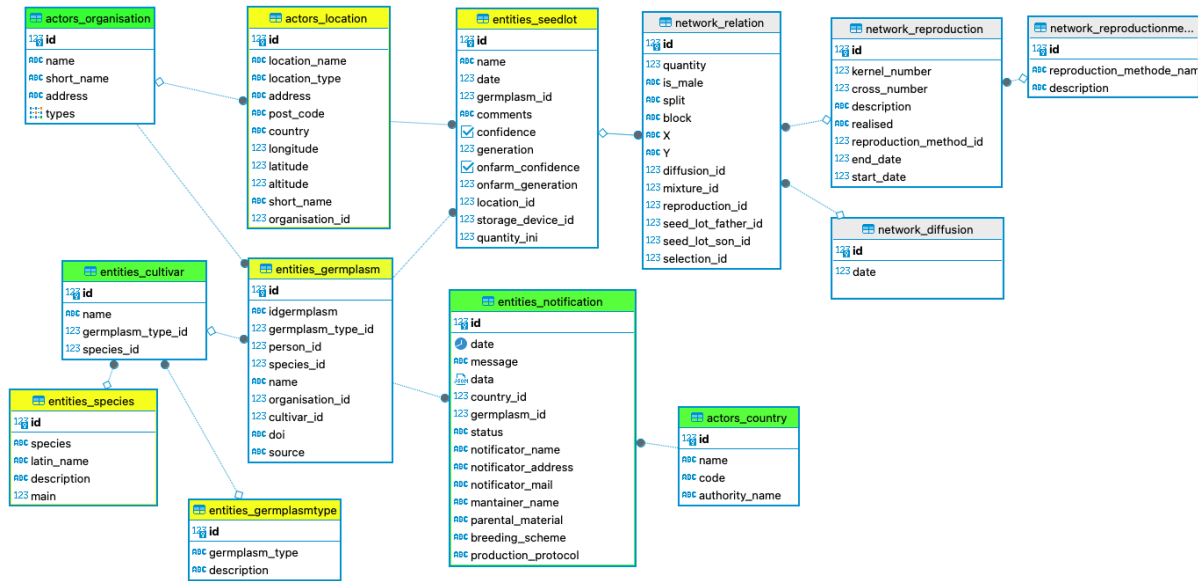


Figure 3 Entity-relationship diagram of OHMTrack. Green exhibits entities added to the original SHiNeMaS structure, yellow shows fields required for traceability added to OHMTrack, while white is for the tables used from SHiNeMaS without modifications

OHMTrack has been developed to **support multiple languages**. The current version is available in **English, Italian, and French**, with the possibility to include more languages in the future. At the moment a spreadsheet has been created to manage and track the strings that need to be translated.

3.2 API development

All OHMTrack functionalities are accessible via an Application Programming Interface (API), enabling external software to retrieve and insert data in OHMTrack programmatically.

A subset of BRAPI APIs (Selby *et al.*, 2019) has been developed in read mode, allowing the extraction of the OHM data in the JSON format defined by BRAPI API version 2.0. Figure 4 displays the results of the BRAPI APIs validations done using BRAVA, the Breeding API (BrAPI) Validator (<https://webapps.ipk-gatersleben.de/brapivalidator/>).

Each dataset is protected by an OAuth2 access token, needed to access the related information. Here is a short description of the APIs:

- Server Info - return the capabilities of the OHMTrack server;
- Sommon crop names - return the list of crops;
- Locations - return the organisation's location where the seed has been reproduced or stored;
- Germplasm - returns the germplasm stored in the organisation;
- Seed lots - return seed lot details and the associated transactions allowing the traceability of each seed lot entered in the system

The POST and PUT calls, which allow external systems to enter data into OHMTrack, are currently not developed. It is being evaluated whether the APIs can also support the data entry into OHMTrack.

Test result:	17/02/2025
Toggle tests not present in the resource /calls	Median response time: 373.5ms
Server Info (1/1)	▼
✓ GET /serverinfo	379ms ▶
Common Crop Names (1/1)	▼
✓ GET /commoncropnames	373ms ▶
Locations (1/2)	▼
✓ GET /locations	374ms ▶
✗ POST /locations (wrong status code)	363ms ▶
Germplasm (3/6)	▼
✓ GET /breedingmethods	367ms ▶
⚠ GET /germplasm (schema mismatch)	382ms ▶
✓ GET /germplasm/{germplasmDbld}	370ms ▶
✓ GET /germplasm/{germplasmDbld} with second Dbld	389ms ▶
✗ POST /germplasm (wrong status code)	375ms ▶
✗ PUT /germplasm/{germplasmDbld} (wrong status code)	368ms ▶
Seed Lots (5/8)	▼
✓ GET /seedlots	372ms ▶
✓ GET /seedlots/transactions	375ms ▶
✓ GET /seedlots/{seedLotDbld}	377ms ▶
✓ GET /seedlots/{seedLotDbld} with second Dbld	394ms ▶
✓ GET /seedlots/{seedLotDbld}/transactions	387ms ▶
✗ POST /seedlots (wrong status code)	369ms ▶
✗ POST /seedlots/transactions (wrong status code)	373ms ▶
✗ PUT /seedlots/{seedLotDbld} (wrong status code)	368ms ▶

Figure 4 Test result of the OHMTrack BRAPI API

3.3 Installation

To facilitate the deployment of OHMTrack, the platform is available as a Docker image. Users can choose to access the public instance of OHMTrack or deploy the application on their own premises if required.

The source code of OHMTrack is available at the following public repository: <https://git.aedit.it/aedit/ohmtrack>.

OHMTrack public instance can be accessed at the following address: <https://ohmtrack.aedit.it/>. The platform will be registered under the liveseeding.eu domain.

4. OHMTrack manual

This section contains the OHMTrack user manual, outlining the main functionalities of the platform. The manual will be updated whenever new functions are added, or modifications are made.

4.1 Login

On the landing page, the login function is available (Figure 5).



Figure 5 Home page of OHMTrack (<https://ohmtrack.aedit.it/>)

To access, users have two options (Figure 6):

- Log in with an existing Google account (no need to remember a password);
- Click on “register” to create a new user.

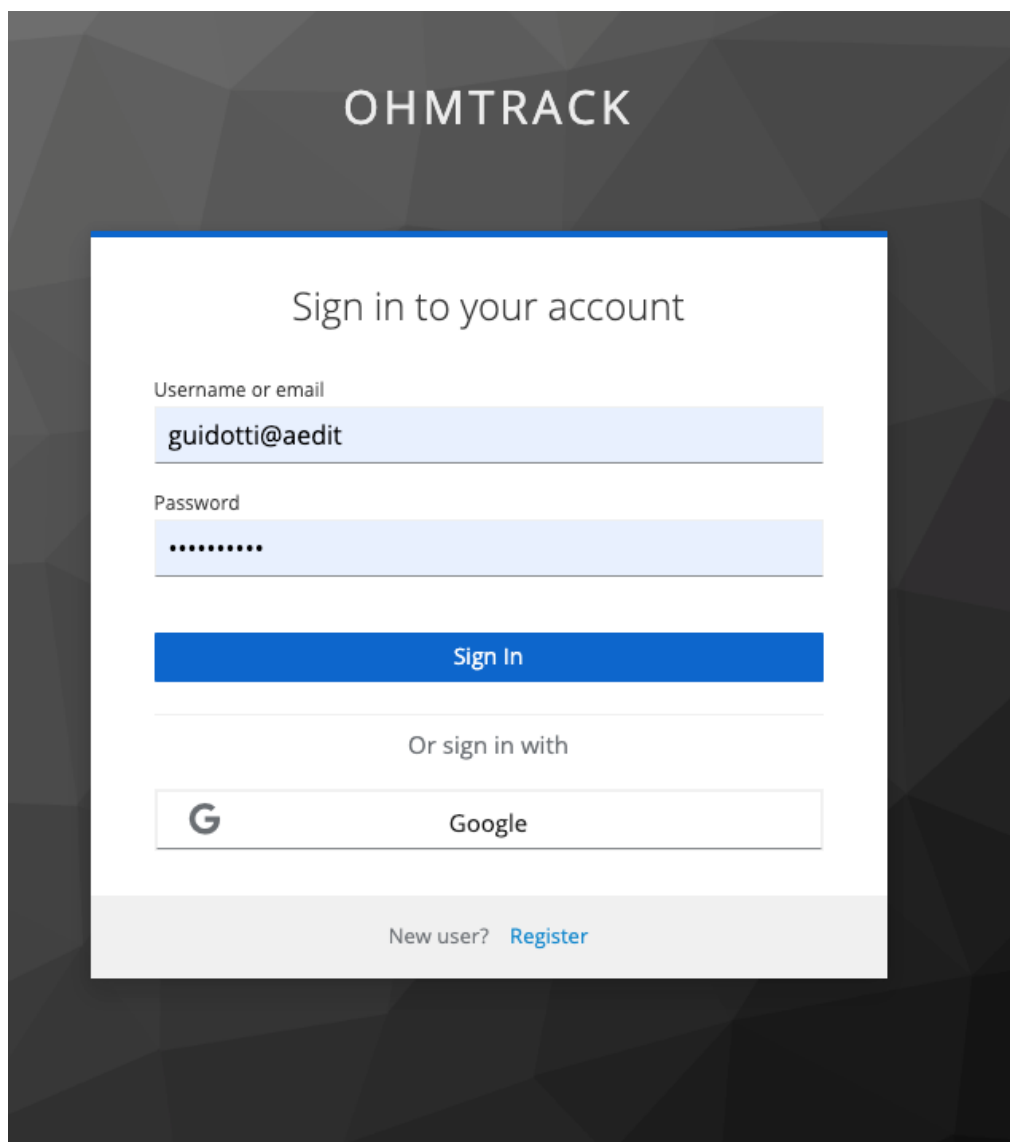


Figure 6 OHMTrack login interface

Once logging in, the system requires the selection of the role of the user (e.g., breeder, producer) and the name of the organisation (Figure 7). After the first access, users can utilise the seed lot tracking function. Authorities must wait for formal approval before accessing the seed lot monitoring features.

Figure 7 OHMTrack page for selecting the role of the user

4.2 Creation of the first seed lot

A guided procedure has been implemented to support the creation of the first seed lot (Figure 8). The process consists of the following steps:

- Identify the location where the seed lot is stored or cultivated;
- Specify the germplasm linked to e.g., a specific region where the OHM is multiplied (as well as an OHM denomination);
- Create the initial seed lot for that germplasm at the designed location.

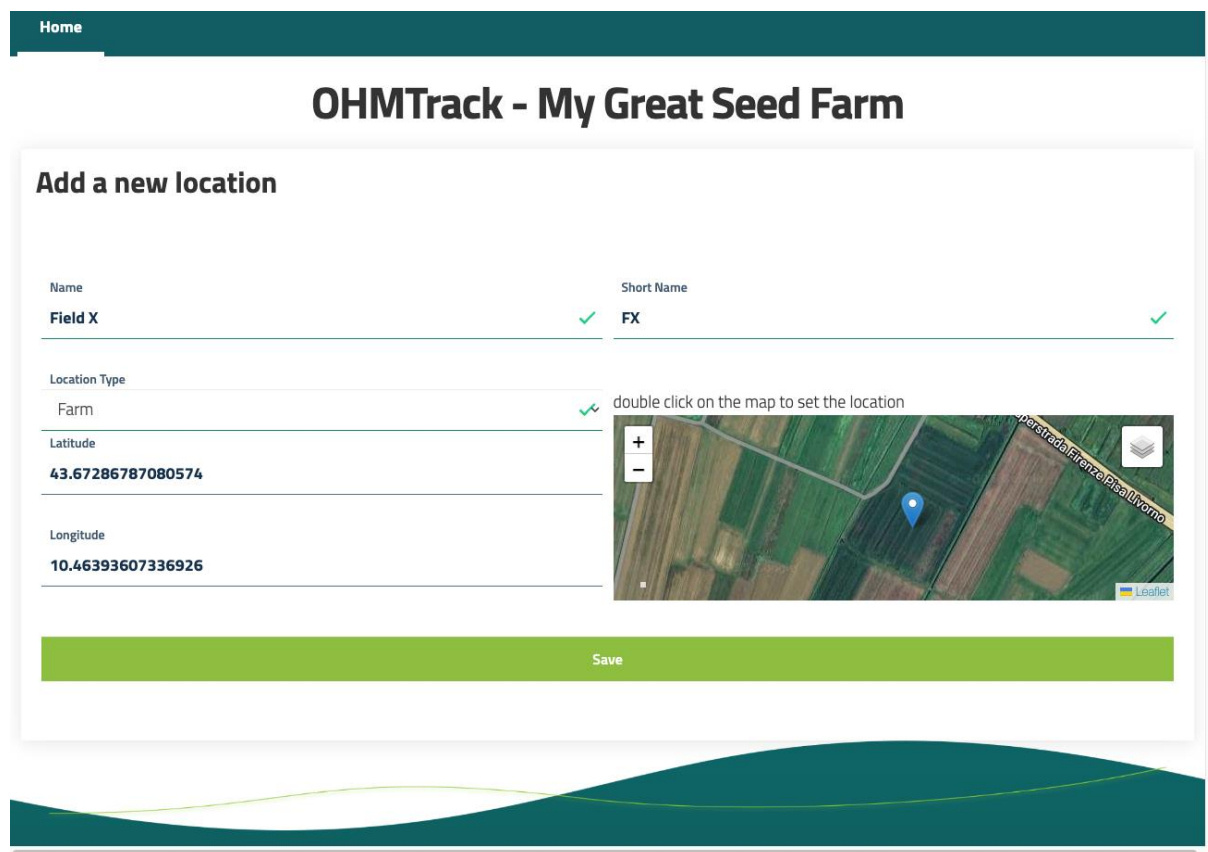


Figure 8 OHMTrack interface for creating the initial seed lot

For each location, the user must select its typology:

- Seed bank - for containers of seeds such as seed banks or silos;
- Farm - for agricultural fields where the seed is reproduced.

The user can click on the map to get the coordinates of the location.

To add a germplasm to the system (Figure 9) the user must select a crop, enter a denomination and choose the type of germplasm. As types of germplasm, the special OHM designation is available.

Home

OHMTrack - My Great Seed Farm

i There is no germplasm in the system. Please, add a new one.

Specie
Triticum aestivum L. ✓

Create a new Denomination for a genetic material (e.g. name of OHM or variety) Use an existing Denomination for a genetic material

Denomination of Genetic Material
EvoDUR

Germplasm Type
OHM ✓

Germplasm Name
EvoDUR - first batch ✓

Source of the germplasm (owner, institution, etc.) Original DOI or accession_code

RSR RSR6001

Add germplasm

Figure 9 OHMTrack interface for adding a germplasm

The following step is to add a seed lot (Figure 10). A “seed lot” is a specific quantity of seeds belonging to a germplasm, stored or planted in a designated location.

OHMTrack - My Great Seed Farm

Add a new seedlot

Location Field X	Germplasm 59-EvoDUR - first batch
Date 2025 February 5	Quantity (grams) 12000 ✓

Comments
First Enter

Save

Figure 10 OHMTrack interface for adding a seed lot

At the end of the procedure, the first seed lot is created. The user can access the main interface (Figure 11), where all the data can be managed.

The next section explains how to create a second seed lot starting from the initial seed lots of the germplasm.

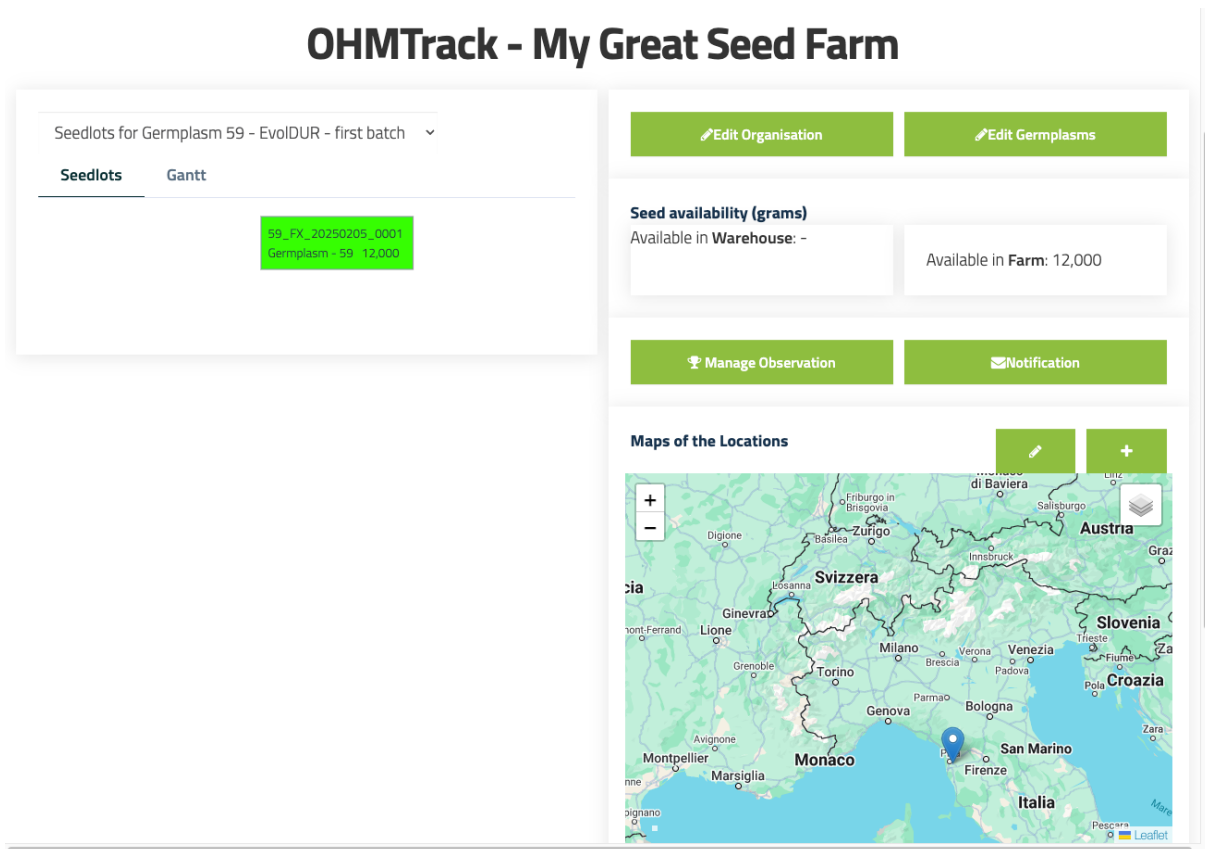


Figure 11 OHMTrack interface displaying the created seed lot

4.3 Diffuse and reproduce the seed lots

After creating a seed lot in OHMTrack two options are possible:

- Transfer the seed lot to another location;
- Reproduce the seed lot.

To transfer the seed lot, the user clicks on the corresponding button (Figure 12), selects the location from the drop-down menu, specifies the date of the event, enters the quantity and indicates if the seed lot is split or not (Figure 13).

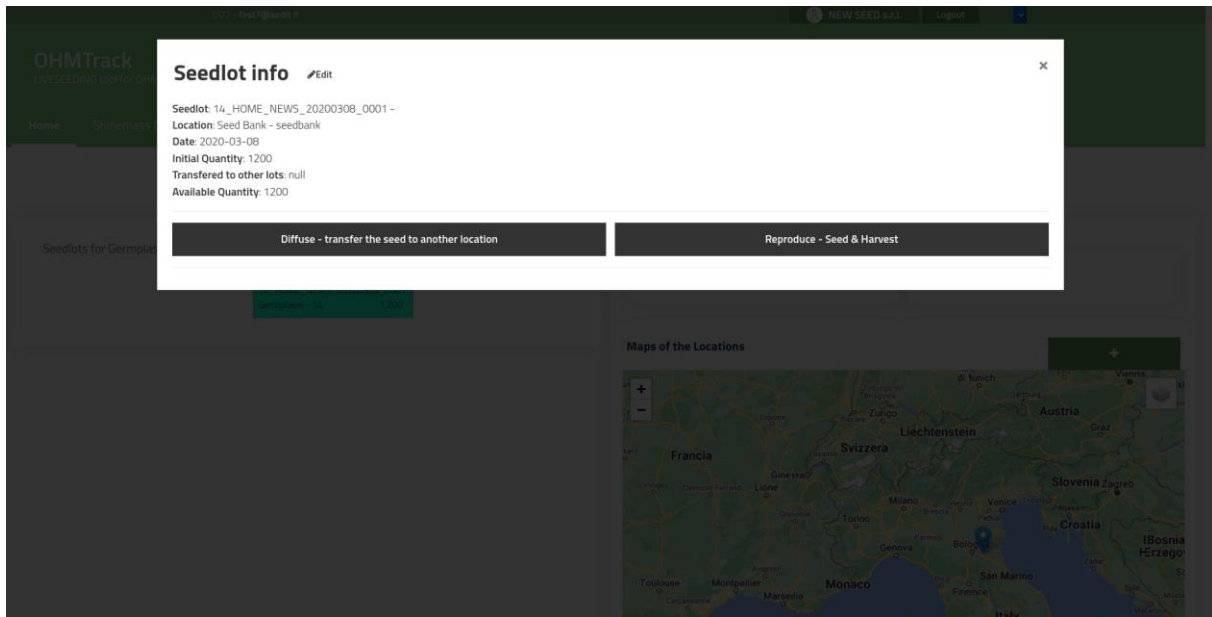


Figure 12 OHMTrack interface for transferring a seed lot

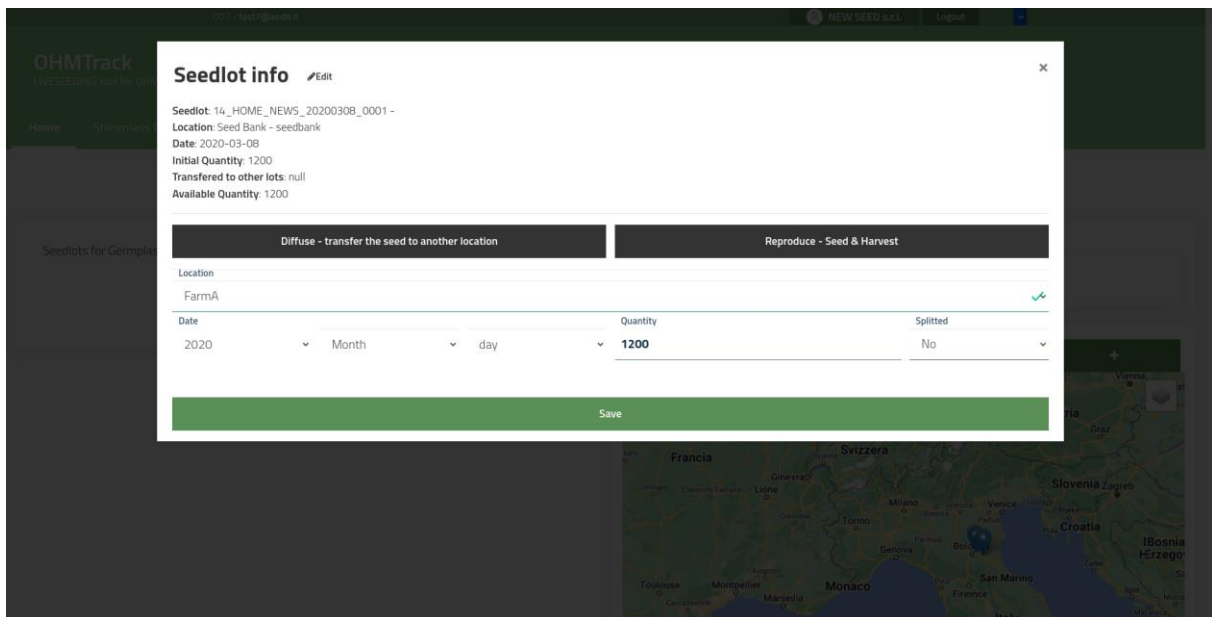


Figure 13 OHMTrack interface for entering seed lot transfer detail

After creating a new seed lot, the page updates showing in a chart the seed lots and their relative connection and a summary of the available seed amount at farm and warehouse level (Figure 14).

OHMTrack - My Great Seed Farm

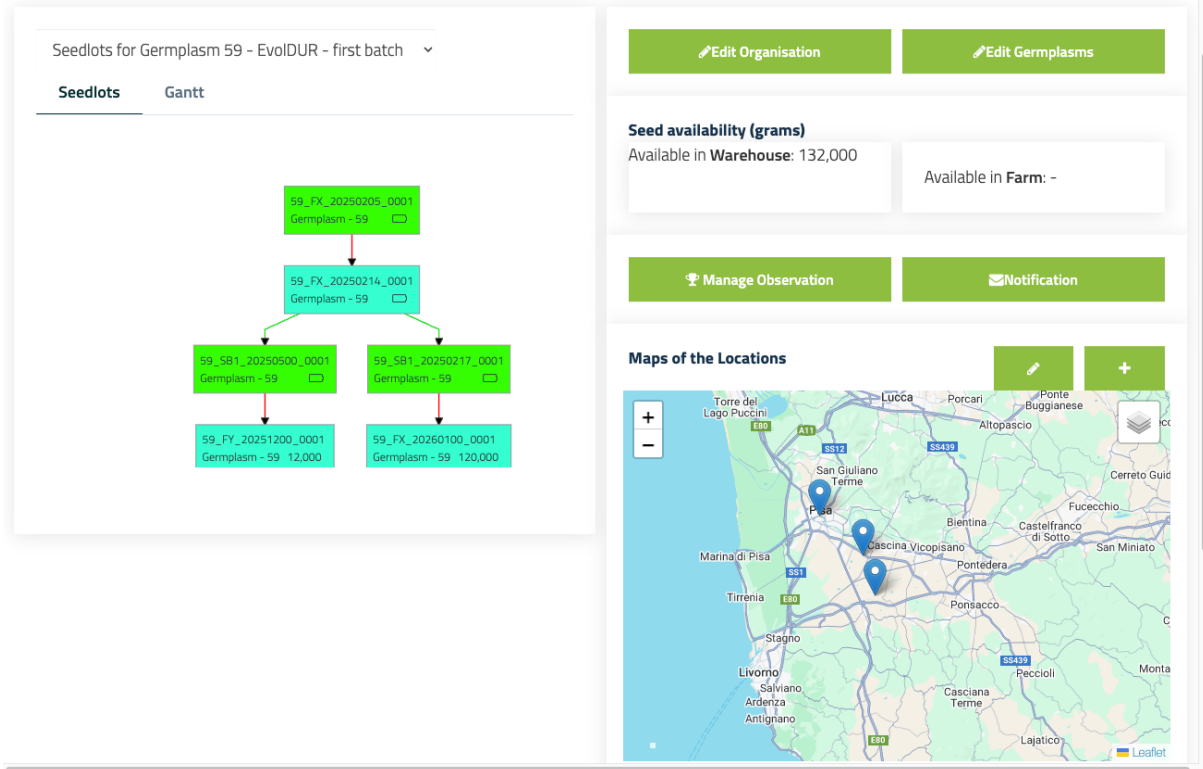


Figure 14 OHMTrack interface showing the details of the seed traceability

4.4 Submission of the notification

The “notification page” is accessible directly from the home page. This section allows breeders or seed producers to submit notifications in countries that accept notification via OHMTrack. Upon accessing the notification page (Figure 15), users can view any existing notifications sent to national authorities, along with their current status. This allows users to monitor the progress of their submissions and take further action if needed.

To create a new notification, users must click the “start a new notification” button.

A notification can have one of the following statuses:

- 📄 **Draft** - the notifier is still working on the notification, and it is not yet ready to be submitted;
- 📄 **Submitted** - the notification has been completed and sent for review by the relevant authority;
- 📄 **Accepted** - the notification has been reviewed and implicitly or expressly approved.
- 📄 **Rejected** - the notification has been reviewed but rejected by the authority;


Home

Notification

Start a new notification


Data	Country	Status	Actions
2025-02-13	France	Draft	Edit Delete Submit to Notifier
2024-12-18	Italy	Draft	Edit Delete Submit to Notifier


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Figure 15 Notification page

The notification form (Figure 16) follows the structure outlined in Section 2.2. At the moment, a common list of fields and a simplified workflow are defined for all countries. Both the workflow and data fields can be customized to meet country specific requirements.

Create a new notification [X]

Date of Request: **17/03/2025** ✓

Country: **BSA (Germany)** ✓

Notificator Name: **Diego Guidotti**

Notificator Address: **Pisa** ✓

Notificator Mail: **guidotti@aedit.it** ✓

Maintainer Name (if different):

Parental Material: **The origin of....**

Breeding Scheme:

Production Protocol:

Location of Breeding and production:

Figure 16 Form to create a new notification

From the notification page, users can manage the notifications that are still in draft status (Figure 17) by:

- ✎ Editing the data;
- ✎ Deleting the notification;
- ✎ Submitting the notification to authorities (Figure 18).

Edit notification

Date of Request: **18/12/2024** Country: **CREA (Italy)**

Notificator Name: **asasas** Notificator Address: **asa** Notificator Mail: **asas**

Maintainer Name (if different): **Diego Guidotti**

Parental Material: **Lorem ipsum dolor sit amet, consectetur adipiscing elit. Cras accumsan ligula nec sollicitudin consequat. Aliquam pulvinar a neque sit amet iaculis. Praesent hendrerit lacus non lorem iaculis, non iaculis nulla hendrerit.**

Breeding Scheme: **Etiam imperdiet felis non leo lobortis lacinia. Aenean elementum, urna a auctor hendrerit, sapien augue tristique nisi, nec posuere nulla neque a purus. Morbi cursus, tortor aliquam faucibus rhoncus.**

Production Protocol: **Aliquam gravida tellus non enim porttitor, non tincidunt sapien ultricies. Sed viverra purus id lorem feugiat, non euismod sem elementum. Nulla eu aliquet augue, vel maximus turpis. Suspendisse vel lectus quis lectus lacinia**

Location of Breeding and production:

Figure 17 Edit an existing notification in draft model

Submit the notification

ⓘ Are you sure to submit this notification?

Date	Country	Status	Actions
2025-02-13	France	Draft	Edit Delete Submit to Notifier
2024-12-18	Italy	Draft	Edit Delete Submit to Notifier

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Figure 18 Submit the notification for review

Once notification has been submitted, its status changes to “submitted” status. After this stage, users can only view the submitted information, editing or deleting the notification is no longer possible (Figure 19).

Home

Notification

Start a new notification

Data	Country	Status	Actions
2024-12-18	Italy	submitted	View
2025-02-13	France	Draft	Edit Delete Submit to Notifier

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Figure 19 List of notifications created by a user

4.5 Authority dashboard

When the authority logs into OHMTrack, the interface displays a list of OHMs that have been submitted for notification.

From the interface, the authority can:

- 📄 View and download the notification form;
- 📄 Approve or reject the notification;
- 📄 Review traceability data: location, amounts, and the organisations involved.

The notification page lists the request with their relative status (Figure 20). Notifications marked as “submitted” are ready for evaluation.

ADMIN - diego.guidotti@gmail.com Italy - CREA Esci English

OHMTrack

Home

OHMTrack - Italy - CREA

ID	Date of Request	Species	Denomination	Germplasm	Type of Material	Organisation	Status
6	2023-09-27	Pisum sativum L.	T18	BGT18	Breeder's line	LSSV	Draft
7	2023-09-27	Allium cepa L.	di Certaldo	First entry	OHM	Semi belli	Draft
10	2024-12-18	Hordeum vulgare L.	EvolHordeum	Base	OHM	Questa è la mia org!	submitted

Disclaimer



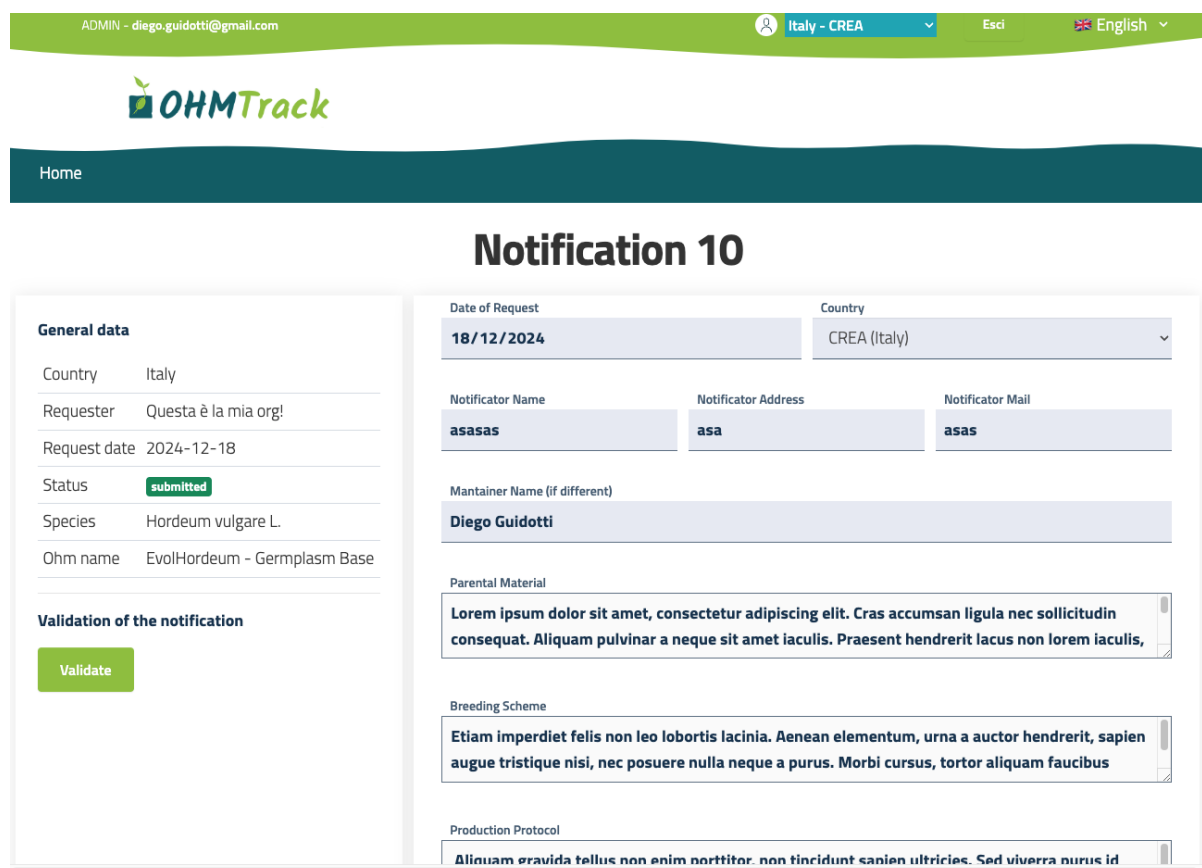
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Figure 20 OHMTrack interface showing the details of the seed traceability

Upon accessing a notification, the authority can review the data entered by the notifier and either accept or reject the notification by selecting “validate” (Figure 21).



ADMIN - diego.guidotti@gmail.com Italy - CREA Esci English

OHMTrack

Home

Notification 10

General data

Country Italy

Requester Questa è la mia org!

Request date 2024-12-18

Status **submitted**

Species Hordeum vulgare L.

Ohm name EvolHordeum - Germplasm Base

Validation of the notification

Validate

Date of Request 18/12/2024 Country CREA (Italy)

Notificator Name asasas Notificator Address asa Notificator Mail asas

Maintainer Name (if different) Diego Guidotti

Parental Material Lorem ipsum dolor sit amet, consectetur adipiscing elit. Cras accumsan ligula nec sollicitudin consequat. Aliquam pulvinar a neque sit amet iaculis. Praesent hendrerit iaculis non lorem iaculis,

Breeding Scheme Etiam imperdiet felis non leo lobortis lacinia. Aenean elementum, urna a auctor hendrerit, sapien augue tristique nisi, nec posuere nulla neque a purus. Morbi cursus, tortor aliquam faucibus

Production Protocol Aliquam gravida tellus non enim norttitor. non tincidunt sapien ultricies. Sed viverra nurus id

Figure 21 OHMTrack interface showing the notification to the authority

The validation form (Figure 22) allows the authority to specify:

- 📅 The date of validation;
- 📄 The outcome of the evaluation: validated or rejected;
- 📝 Any additional comments.

Authorities can also expand the validation data to include further information related to the notification, such as recommendations, file uploads, or the assigned notification number.

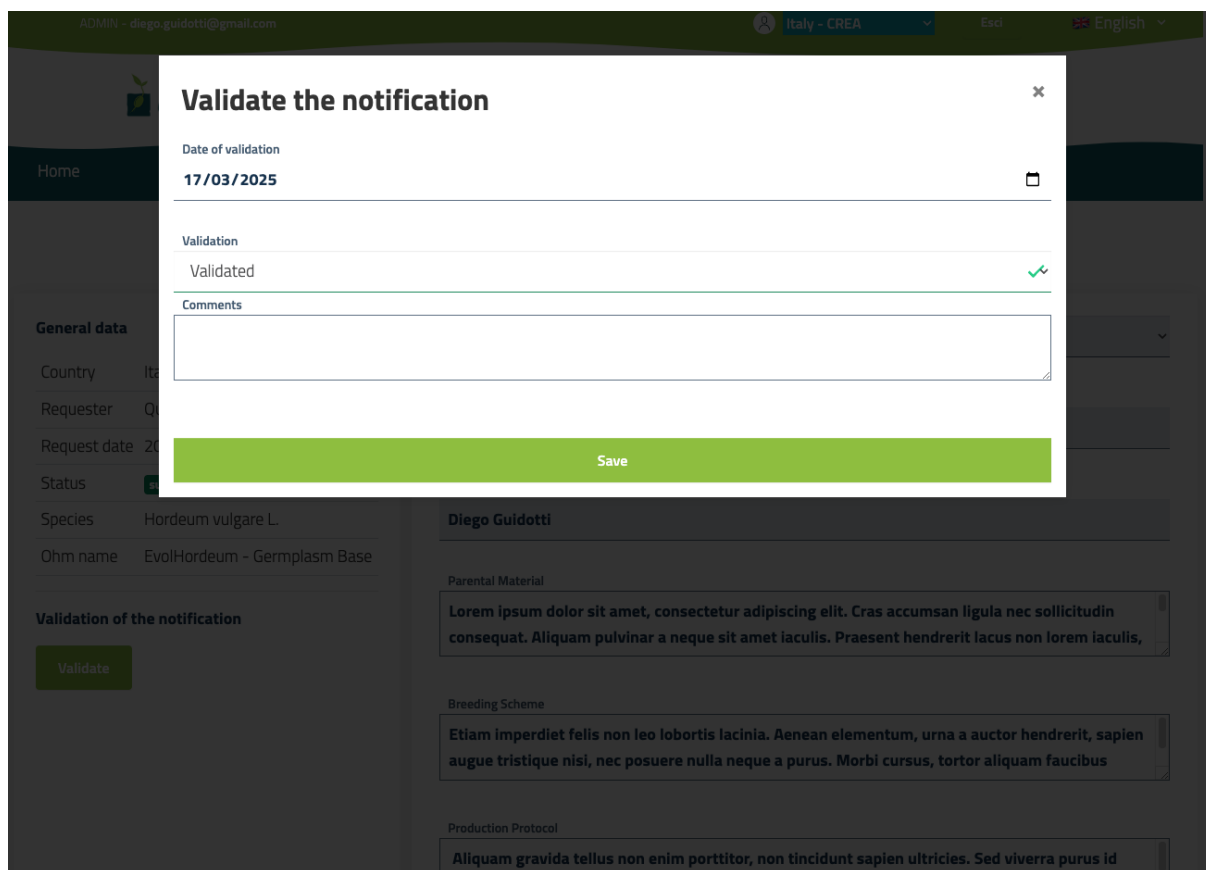


Figure 22 OHMTrack interface showing the validation of the notification

Breeders or seed producers will be able to view the results of the notification in the homepage of the submitted notification (Figure 23).

ADMIN - diego.guidotti@gmail.com test3@aedit.it public Esci English

OHMTrack


Home

Notification

Start a new notification

Data	Country	Status	Actions
2024-12-18	Italy	Rejected Please send again the notification with a more detailed description of the Breeding activities	View
2025-02-13	France	Draft	Edit Delete Submit to Notifier

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Figure 23 OHMTrack interface showing the notification status.

Once validated, the notifier can access the notification page (Figure 24) to view the full traceability details of the OHM, including:

- The current stock available both in storage and on farm;
- The list of seed lots and the full pedigree of the notified OHM.

ADMIN - diego.guidotti@gmail.com Italy - CREA Esci English

OHMTrack

Home

Notification 12

General data

Country: Italy

Requester: Questa è la mia org!

Request date: 2025-03-20

Status: validated

Species: Zea mays L.

Ohm name: EvulCorn - Germplasm EvulCorn

Validation of the notification

Validate

Notification Traceability

Available In Warehouse: 120,000 Available In Farm: 33,200

```

graph TD
    Root["61_GB1_20250000_0001  
Germplasm - 61"]
    L1L["61_GB1_20250103_0001  
Germplasm - 61"]
    L1R["61_GB1_20250107_0001  
Germplasm - 61"]
    L2L["61_a1_20250111_0001  
Germplasm - 61"]
    L2R["61_a2_20250108_0001  
Germplasm - 61"]
    L3L["61_a1_20260104_0001  
Germplasm - 61"]
    L3R1["61_a2_20251012_0001  
Germplasm - 61"]
    L3R2["61_a2_20260200_0001  
Germplasm - 61 32,000"]
    L4L["61_a1_20261100_0001  
Germplasm - 61 120,000"]
    L4R["61_A3_20260100_0001  
Germplasm - 61 1,200"]

    Root --> L1L
    Root --> L1R
    L1L --> L2L
    L1R --> L2R
    L2L --> L3L
    L2R --> L3R1
    L2R --> L3R2
    L3L --> L4L
    L3R1 --> L4R
  
```

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Figure 24 OHMTrack interface showing the traceability details

5. Future developments

During the testing of OHMTrack, new developments and features were identified. These functionalities will be further enhanced in the next project period:

- Evaluation of the possibility of OHMTrack data for marketing the OHM (creating QR codes and a public version of traceability);
- Expanding of the interoperability functions (to be further developed in Task 9.3) e.g., data exchange using BRAPI with SHiNeMaS, data exchange with seed bank databases (e.g., Rete Semi Rurali DB), and integration with SeedLinked data on crop phenology.

Any requests coming from the users to better refine the platform functionality will be monitored.

The next development steps of the OHMTrack will be discussed in the following deliverables:

- **D.2.2 Guidelines for OHM notification** (month 32, end of May 2025) - this deliverable will contain the final recommendation of LiveSeeding project for notification. Workshops have been conducted to define the data required in the notification process, and any updates will be monitored and transferred to the platform;
- **D.9.1 Report on internal and external interoperability of LiveSeeding digital tools** (month 48, September 2026) - this deliverable will present the final version of OHMTrack, including descriptions of the interoperability functions developed for data exchange between OHMTrack and the other adopted tools, as well as an update of the user manual.

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Annex 1 Commission delegated regulation (EU) 2021/1189

Regulation (EU) 2018/848 of the European Parliament and of the Council as regards the production and marketing of plant reproductive material of organic heterogeneous material of particular genera or species

Available on : <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R1189>