LiveSeeding

Guidelines for OHM notification

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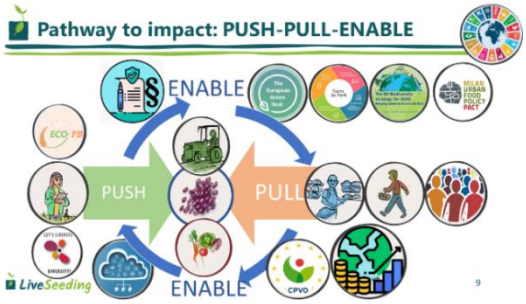
LiveSeeding - Organic seed and plant breeding to accelerate sustainable and diverse food systems in Europe *is a 4-year Innovation Action funded by the European Union, the Swiss State Secretariat for Education, Research and Innovation (SERI) and UK Research and Innovation (UKRI). The project started 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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API	Application Programming Interface
BRAPI	Breeding Application Programming Interface
CCP	Composite Cross Population
CPVO	Community Plant Variety Office
DP	Dynamic Population
DR	Delegated Regulation
DUS	Distinctness, Uniformity and Stability
EC	European Council
ECO-PB	European Consortium for Organic Plant Breeding
EEC	European Economic Community
EU	European Union
Fn	Filial generation n after the crossing of parental genotypes
FS	Farmers' Selection
HM	Heterogeneous Material
MAGIC	Multi-parent Advanced Generation Inter-Cross Population
OHM	Organic Heterogeneous Material
OR	Organic Regulation
PRM	Plant Reproductive Material
Sx	Selfing generation x
UPOV	International Union for the Protection of New Varieties of Plants
VCU	Value for Cultivation and Use
WP	Work Package

Summary

Organic Heterogeneous Material (or OHM for short) is a novel cultivar category introduced in the EU Organic Regulation No. 2018/848. It is characterised by a high level of genetic diversity as well as its dynamic nature allowing it to adapt to different growing conditions.

OHM may be only marketed after it is notified by means of a descriptive dossier, which is sent to the competent authorities together with a representative sample. The description of the OHM consists of five main elements. Among them, there are a phenotypic characterisation, documentation of agronomic traits, the parental material and breeding process.

The objective of this deliverable is to provide background information, guidelines for OHM notification and recommendations on the basis of past experience. Target groups of this document include: breeders, seed producers, responsible authorities and policy makers at the national and European level.

Section 1 provides the basic definition, legal framework, advantages and properties of OHM.

Section 2 provides guidelines on how the elements of the OHM description may be presented by the applicant. In addition, the main steps of the notification procedure from the preparation of the documents to the listing and marketing of the OHM are explained in detail.

Sections 2.4 and 3.1 present notification forms provided by the authorities to enter the information of the dossier and the open-source software tool OHMTrack facilitating the notification procedure, respectively. The remainder of **section 3** is devoted to an outlook on the post-marketing, risk-based official controls for Plant Reproductive Material (PRM) of OHM as well as on maintenance breeding.

Section 4 is dedicated to the presentation of experience from different EU Member States on the implementation of the notification procedure, including an overview of all the 49 OHM cultivars of seven agricultural and nine vegetable species currently notified in eight EU Member States.

Finally, in **section 5**, conclusions and policy recommendations are developed to improve the implementation of the regulatory framework for OHM, relating to the notification procedure, the official controls of PRM marketing as well as the policy and legal basis. These can be summarised as follows:

- Clear and comprehensive cultivar descriptions should be mandatory and publicly accessible to ensure transparency and traceability.
- Field trials for agronomic and quality traits should be expanded, including targeted and low-cost testing schemes.

- Competent authorities must have the power to request corrections or terminate notifications when needed.
- PRM certification bodies should oversee risk-based post-marketing controls, with roles clearly defined alongside organic control authorities.
- Labelling requirements must be strictly enforced to avoid misleading claims.
- Finally, while OHM may benefit conventional agriculture, its regulatory framework must remain stable to safeguard existing value chains and protect the interests of the organic sector.

1. Introduction

1.1 Definition of OHM

'Organic Heterogeneous Material' (hereinafter referred to as OHM) is a **novel cultivar category** introduced in the European Regulation (EU) No. 2018/848 on organic production and labelling of organic products (the "Organic Regulation"). A key feature of OHM is that it **does not meet the variety definition** set out in Council Regulation (EC) No. 2100/94, particularly in terms of uniformity among individual plants within the material. Instead, OHM is defined as follows (Box 1):

Box 1: Basic definition of Organic Heterogeneous Material (OHM) in the European Organic Regulation (EU) No. 2018/848, Art. 3 (18)

"OHM means a plant grouping within a single botanical taxon of the lowest known rank which:

(a) presents common phenotypic characteristics;

(b) is characterised by a high level of genetic and phenotypic diversity between individual reproductive units, so that that plant grouping is represented by the material as a whole, and not by a small number of units;

(c) is not a variety within the meaning of Art. 5 (2) of Council Regulation (EC) No. 2100/94;

(d) is not a mixture of varieties; and

(e) has been produced in accordance with this Regulation."

There are **two important defining properties of OHM (at a genetic and phenotypic level)**. The first property follows directly from the basic definition in Box 1:

1. **OHM must exhibit a certain minimal degree of heterogeneity** between its constituent plants **for some phenotypic characteristics**. These may include characteristics proposed by the 'International Union for the Protection of New Varieties of Plants' (UPOV) (such as the presence or absence of awns or different ear colours in wheat, see Fig. 1). Note that it is not a contradiction that the **OHM must also present other common characteristics**. Of particular importance in that regard may be agronomic and quality traits (such as yield, baking quality and specific disease resistances in the case of the wheat OHM from Figure 1).

The second important defining property of OHM is clarified in Recital (6) of the Delegated Regulation (EU) No. 2021/1189 (which supplements the Organic Regulation with more detailed rules on the marketing regime for OHM, see also Section 1.2):

2. In addition to its phenotypic and genetic heterogeneity **OHM is characterised by its dynamic nature** allowing it to evolve and to adapt to different growing conditions or locations. OHM is thus expected to change over time. In particular, OHM is neither a mixture of varieties (see Box 1) nor a synthetic variety, which is also recreated from pre-defined parental stocks every growing season. Instead, **OHM is managed as a so-called bulk population**, i.e. it is repeatedly resown and harvested in subsequent generations after its initial creation. Specific local adaptions can be achieved through natural and/or human selection.

Figure 1: Winter wheat OHM 'Liocharls' with awned as well as unawned ears and ears of different colours and shapes. This OHM is officially notified in Germany.

Next, we will present concrete **breeding techniques used for the development of OHM**. According to Constanzo & Bickler (2019) (and see also Art. 4 of the Delegated Regulation (EU) No. 2021/1189) three main approaches exist (Box 2):

Box 2: Breeding techniques for the development of OHM, which are associated with different types of OHM.

The three categories of breeding techniques differ (mainly) in terms of the **initial development stage**:

1. Composite Cross Populations (CCP) result from targeted crosses between the parental material. Different crossing protocols can be employed: classic examples include the half or full diallel, factorial or MAGIC (Cavanagh et al. 2008) crossing schemes. The progenies of these crosses are then bulked, often in the first or second generation after the crossing (F1 or F2 generation) with equal amounts of seeds used from each crossing.

2. Dynamic Populations (DP) are generated by physical mixtures of seeds (or more generally plant reproductive material) of the parental material (e.g. breeding lines from different generation F1 - Fn[1] , cultivars not protected by plant breeders' rights or gene bank accessions), which are multiplied for several generations as a bulk population before its release to the market. The degree of outcrossing will vary depending on the species and environmental conditions, but some level of recombination and trait divergence is expected between individuals (Allard & Hansche 1964).

3. Farmers' Selections (FS) are developed from e.g. landraces with a high level of phenotypic and genetic diversity by on-farm management practices, including (mass) selection and maintenance breeding by farmers.

Article 4 (2.c) of the Delegated Regulation (EU) No. 2021/1189 foresees that **combinations of these three and also other techniques** may be applied to develop OHM. After the initial creation by these techniques the OHM will then be managed as a bulk population as mentioned above. There may or may not be a different focus regarding the importance of human selection or adaptation to specific locations depending on the OHM type and community involved in the maintenance of the population. It is important to emphasise that **artificial (negative or positive) selection steps by breeders or farmers are explicitly allowed** according to the Delegated Regulation 2021/1189, provided that the degree of heterogeneity of the OHM is not reduced to such an extent that the conditions in Box 1 are no longer fulfilled.

It is important to highlight that this definition significantly broadens the **scope of the definition of OHM** compared to the Commission Implementing Decision (EU) No. 2014/150, which established a temporary experiment on cereal populations. (The only exception is that OHM plant reproductive material must be multiplied under certified organic conditions):

1. **OHM exists for all crop species** of the 'horizontal legislation' on the marketing of Plant Reproductive Material (PRM) consisting of the 11 sectoral Directives, including (EEC) No. 66/401, 66/402, (EC) No. 2002/55, 2008/72/EC and 2002/57 for

[1] n is a whole number bigger than 1. For outcrossing crop species the generations of the breeding lines may refer to the selfing generations, which are usually denoted by the letters S1 - Sx.

fodder plants, cereals, vegetables, oil and fibre plants. For all other species heterogeneous material (HM) can still be marketed, however, there is no legal basis required to place that PRM on the market.

2. **Human selection in addition to natural selection is explicitly allowed** so that OHM can be improved by breeders and farmers. This is particularly important for sanitary reasons, when diseased plants (e.g. with bunts or smuts, see also section 3.3) need to be removed from the OHM.
3. The definition covers **a broad spectrum of OHM types in terms of breeding techniques and parental material**. Options range from complex crossing schemes to relatively informal breeding activities, and from modern hybrids to traditional and landrace varieties.

These possibilities should help to contribute to the availability of a higher diversity of cultivars adapted to the requirements of organic farming. In particular, this should enable the organic sector to reach the goal that all PRM used in organic farming shall be organically produced by 2036.

1.2 Legal basis

The legal framework for Organic Heterogeneous Material (OHM) is provided by the **European Organic Regulation (EU) No. 2018/848**. Moreover, supplementary provisions on the production and marketing of Plant Reproductive Material (PRM) of OHM are contained in the **Delegated Regulation (EU) No. 2021/1189**. Both legislations have been in force since 1st January 2022.

An excellent introduction to the legal basis for OHM is provided in a **booklet** and an accompanying **short video** prepared by the non-governmental organisation Artemisia AISBL (Brussels) and the online exchange platform Seeds4all:
https://liberatediversity.org/wp-content/uploads/2022/02/OHM_Booklet_S4A.pdf
https://www.youtube.com/watch?v=BDkomih6oWY [last accessed 9th April 2025].

Below, an overview of the main elements of the marketing regime of OHM as they are set out in the two European regulations mentioned above is outlined (see Box 3 and 4). This includes key terminology which is referred to throughout this report.

Box 3: Provisions on OHM in the European Organic Regulation (EU) No. 2018/848

- **Recitals (36) - (38)** explain the **motivation** for introducing a legal framework for OHM (see sections 1.3 of this deliverable for more details).
- **Article 3 (18)** contains the **basic definition of OHM** (see section 1.1).
- **Article 13** sets the basic rules for the so-called **notification procedure** as well as the **key content of the Delegated Regulation** on the production and marketing of PRM of OHM (see section 2 and Box 4 below).

It should be emphasised that there is an **important distinction between** the terms **OHM cultivar and Plant Reproductive Material (PRM) of OHM** (Table 1). In connection with OHM this distinction is often not made with sufficient clarity. This may be due to a lack of specific terminology. In this report the terms are explicitly stated in their full form if it is deemed necessary.

Table 1: Comparing the two terms "OHM cultivar" and "PRM of OHM" with regard to their meaning, relevant categories and analogues in the standard PRM legislation

Term	**OHM cultivar**	**PRM of OHM**
Meaning	**Heterogeneous plant grouping** in the sense of Art. 3 (18) of Regulation (EU) 2018/848	**Seeds, cuttings, roots, tubers etc.** used for the reproduction of plants of an OHM
Categories	**Genetic** and legal	**Physical** and legal
Analogue in standard PRM legislations	**Variety**	**PRM** (of a variety)

According to the Organic Regulation (EU) 2018/848 operators are allowed to **market OHM cultivars without having to comply with the requirements for registration (DUS-testing) and to market PRM of OHM without having to comply with the certification categories of pre-basic, basic and certified material** or other categories set out in the 11 PRM Council Directives (EEC) No. 66/401, 66/402, (EC) No. 2002/55, 2008/72/EC etc. (An exception are the minimal requirements for sanitary quality, analytical purity and to some extent germination.)

Instead, Article 13 of the EU Organic Regulation 2018/848 demands that a **notification procedure for OHM cultivars** will be established as a simplified analogue of the registration for standard varieties (see section 3 for a detailed account). In addition, **risk-based, post-marketing controls for PRM of OHM** in accordance with the European "Control" Regulation (EU) 2017/625 will be implemented as a simplified analogue of certification system for PRM of varieties (see section 3.3). Detailed rules for both the notification procedure and the risk-based, post-marketing controls are laid out in the Delegated Regulation (EU) No. 2021/1189 (see Box 4 below).

It is, of course, of great importance that **PRM of OHM must be produced and marketed within the framework of the EU Organic Regulation 2018/848.** Concretely, this means that it must be multiplied under certified organic conditions for at least one or two growing seasons for annual or biennial/other perennial species, respectively[2]. It should be indicated to customers that the PRM is organically produced.

With regard to breeding, the provisions for OHM still require further clarification. In fact, a "working" definition of organic plant breeding was agreed upon only recently

[2] according to Annex II, Part I 1.8.2 of Regulation (EU) 2018/848

within the LiveSeeding project in collaboration with European Consortium for Organic Plant Breeding (ECO-PB). As a common basis, the principles laid out for the cultivar category of "organic varieties suitable for organic production" of Art. 3 (19) of the EU Organic Regulation 2018/848 were used.

To align with the proposed definition of organic plant breeding, **it should be explicitly stated that OHM must be developed under certified organic conditions for a minimum period of time**. For crops propagated by seed, this time span should be at least five generation and years for annual species or four generations and eight years for perennial species. For vegetatively propagated crops, it should be at least three generations and years. It is a policy recommendation of the LiveSeeding project to include a precise definition for the breeding of OHM in the future.

A legal basis for Heterogeneous Material (HM) from conventional production and breeding is foreseen in the proposal of a novel PRM marketing legislation of the European Commission from 5th July 2023. It is to be welcomed if the advantages of HM are also made available to conventional agriculture. However, **no legal uncertainties should be caused for breeders, multipliers, farmers, processors and retailers of OHM**. Already 49 OHM cultivars are notified in the European Union and specialised value chains have been established. The legal framework of OHM should thus remain unchanged to avoid drawbacks for actors of the organic sector (LiveSeeding Policy Brief[3] from April 2024).

Finally, note that since it is not a variety within the meaning of the Council Regulation (EC) No. 2100/94, **OHM cannot be protected by plant breeders' rights**. In order to safeguard the access to the material for organic farmers and breeders, it is important that OHM shall also remain free from genetically modified organisms, novel genomic techniques and patents (LiveSeeding Policy Brief 2024).

Box 4: Delegated Regulation (EU) No. 2021/1189 on the production and marketing of PRM of OHM

This Regulation was adopted by the European Commission on 7th May 2021 and it came into force supplementing the EU Organic Regulation on 1st January 2022. In the following table all articles of the regulation and their main content is summarised. The numbers in the last column refer to the section of this deliverable, where more detailed accounts are given.

Article	Main content of the Article: Requirements for…	Section of the deliverable
1	Crop species, derogation for research and development	1.1

[3] https://liveseeding.eu/wp-content/uploads/2024/11/LS-Policy-Brief_update_V2.pdf [last accessed: 11th April 2025]

2	Basic definitions	1.1
3	Marketing in general	-
4	Description of the cultivar for the notification procedure	2.1 - 2.4
5	Identity of the PRM	2.1 - 2.4
6	Sanitary quality, analytical purity and germination of the PRM	2.2, 3.3
7	Packaging and labelling of the PRM	5
8	Information kept by operators	2.2
9	Risk-based, post-marketing controls of the PRM	3.3
10	Maintenance breeding, if applicable	3.4
11	Entry into force	-

1.3 Advantages and properties of OHM

In **recital (36) of the Organic Regulation** (EU) No. 2018/848, the introduction of a legal framework for OHM is motivated as follows:

> *"Research in the Union on Plant Reproductive Material (PRM) that does not fulfil the variety definition as regards uniformity shows that there could be **benefits of using such diverse material, in particular with regard to organic production**, for example to reduce the spread of diseases, to improve resilience and to increase biodiversity."*

The existing research body was summarised in reviews by Döring et al. (2011), Dawson & Goldringer (2012) and Phillips & Wolfe (2005) (see also Wuest et al. (2021) focusing on variety mixtures). Note that the publications cited in these reviews refer to heterogeneous, diverse, evolutionary or composite cross populations since the term OHM in the sense of the Organic Regulation did not exist yet. **The main advantages of heterogeneous material highlighted in this and also new research include**:

1. **Resilience to pests and (in particular foliar) diseases**: Barrier and dilution effects, competition and a number of other effects may reduce the infection efficiency of pathogens in heterogeneous materials (Finckh et al. 2000, Finckh 2008). An increased disease resistance was found e.g. in the case of wheat for mildew (Paillard 2000a, 2000b) and yellow stripe rust (Baresel et al. 2022, Weedon & Finckh 2021, Goldringer et al. 2001, 1998).
2. **Potential to buffer multiple (a)biotic stressors, addressing the complex challenges of climate change** (as reviewed by Ceccarelli & Grando 2020, see

also Ceccarelli et al. 2010 or Weedon et al. 2023). Some genotypes in heterogeneous materials may tolerate better prolonged dry periods and others higher precipitation, reducing the risks of yield loss. Heterogeneous cultivars of wheat and barley showed a higher (dynamic and static) stability of yield and quality traits across growing environments compared to pure line varieties (Weedon & Finckh 2019, Raggi et al. 2017, Döring et al. 2015, Vollenweider et al. 2021). Bocci et al. (2020) found that heterogeneous wheat populations evolving under drought conditions in Sicily became the highest yielding test entries in their trials.

3. **Adaptation to specific locations and growing conditions.** Changes of heading time were observed by Goldringer et al. (2006) after cultivating wheat populations for 10 generations in contrasting locations in France. More recently, Schneider et al. (2024) using whole-genome pool-sequencing molecular techniques found specific adaptations to conventional and organic farming conditions in barley populations, in particular with respect to traits associated with root morphology. These findings are in line with results from Bertholdsson et al. (2016) showing that the early vigour traits root and shoot length of wheat populations were significantly increased within five generations maintained under organic relative to conventional management (see also Bhaskar et al. 2019 and Raggi et al. 2022). Heterogeneous materials should therefore be particularly suitable for organic and low input farming (Murphy et al. 2004).
4. OHM have the potential to **conserve and increase genetic diversity** within the farming system. Dynamic management strategies were proposed where heterogeneous materials are grown at multiple locations in order to maintain genetic diversity (Henry et al. 1991, Goldringer et al. 1998, Enjalbert et al. 2011). Heterogeneous populations may also serve a "mass reservoirs of variability" (Simmonds 1961) from which lines for standard variety breeding programs can be extracted (Suneson 1956, Harlan 1956). Therefore, OHM and standard variety breeding should be seen as complementary rather than as mutually exclusive approaches. Each strategy has its own unique opportunities and challenges.

OHM may offer **additional socio-economic benefits**: It may contribute to a more resilient local supply of PRM allowing farmers to save their own seed or contribute to regional value chains focusing on marketing OHM with special taste or other characteristics. Traditional landraces may be preserved and their cultural and economic value harnessed.

Most studies found that heterogeneous materials of self-pollinating cereal crops exhibit comparable (mean) yield levels and quality traits compared to standard pure line varieties. OHM offer the important advantages mentioned above. Potential challenges such as the lack of incentives for breeders, insufficient breeding gains, susceptibility

to seed-borne diseases (see section 3.3 for more details) or natural selection of detrimental alleles within the population (Knapp et al. 2020) are addressed within the LiveSeeding project and offer interesting perspectives for future research.
It is important to ensure that the implementation of regulations and associated procedures create an enabling environment for the advantages of OHM to be realised and its properties maintained. Whilst a number of OHM are now notified and in production across Europe, there remains a lack of clarity in some countries as to how the legislation is or will be implemented. Below, in sections 3 and 4, more detail is outlined on procedures in place on time of publication of this report (May 2025).

2. Notification procedure

2.1 Basic outline

Plant Reproductive Material (PRM) of **OHM may only be marketed after the notification of the OHM cultivar.** The corresponding legal framework is contained in Article 13 of the Organic Regulation (EU) No. 2018/848 and mainly in Articles 4, 5 and 8 of the Delegated Regulation (EU) No. 2021/1189. As it was pointed out in section 1.2, the notification procedure of an OHM cultivar may be understood as a simplified analogue of the registration of a standard variety in the sense of the Council Regulation (EC) No. 2100/94.
An OHM cultivar **can be notified by a natural or legal person referred to as the supplier or applicant** in the Organic Regulation (EU) 2018/848 or also as the notifier in this report. The supplier does not necessarily have to be registered as a professional plant breeder[4]. Article 13 (2) of the Organic Regulation (EU) 2018/848 foresees the competent authorities referred to in the 11 sectoral directives of the 'horizontal' PRM legislation as the **official body that implements the notification procedure** in an EU member state. In many member states these are the Plant Variety Offices, see sections 2.5 and 4 for examples.
The notification is made by means of a **descriptive notification dossier** (see Box 5). This dossier is sent by the supplier to the official body. Within three months after the dossier was sent in, provided that no additional information was requested or a formal refusal was communicated, the notification shall be either expressly or implicitly acknowledged by the official body. Finally, the responsible body proceeds to the **official listing of the OHM**, which shall be free of charge to the supplier.

[4] Although e.g. in Germany the notification form can only be accessed if the applicant is registered with an official identification number.

Box 5: The notification dossier must contain (according to Article 13 (2) of the Organic Regulation (EU) No. 2018/848):

(a) the contact details of the applicant;

(b) the species and denomination of the OHM;

(c) the description of OHM (see section 2.3);

(d) a declaration by the applicant concerning the truth of the elements in points (a), (b) and (c); and

(e) a representative sample.

The steps involved in the notification procedure of OHM are described in more detail in the following section 2.2 and the notification dossier for OHM is described in section 2.3.

2.2 Steps of the procedure

An overview of the main steps of the notification procedure of OHM is given in Figure 2.

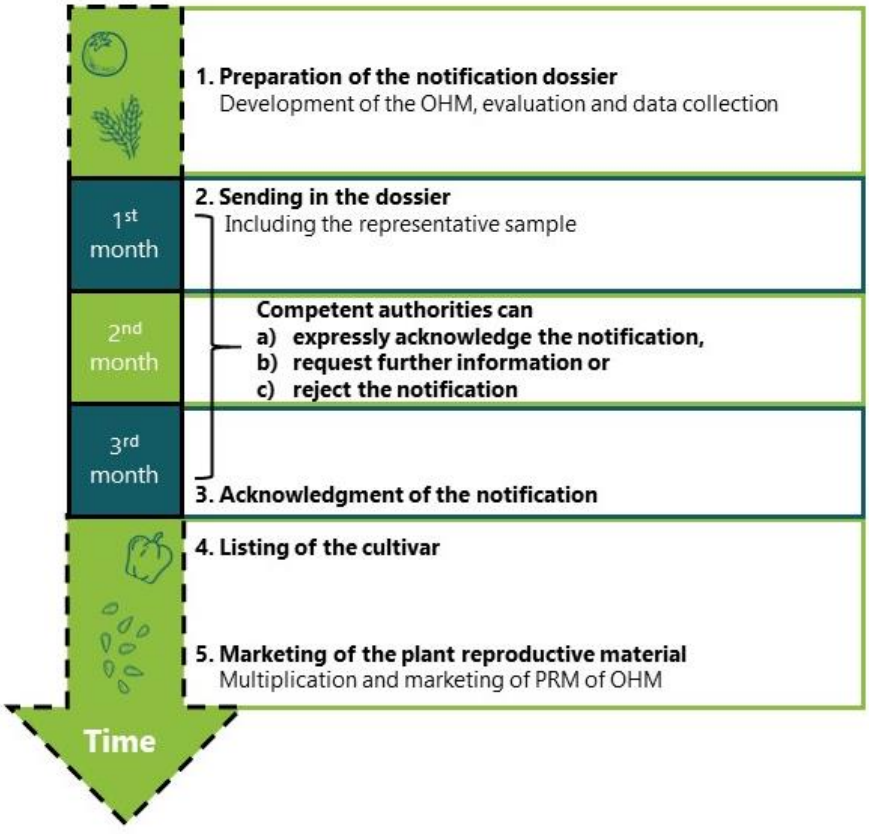

Figure 2: The timeline of the five main steps of the OHM notification procedure

Each of the steps in Figure 2 is explained in more detail below:

1. Preparation of the notification dossier

The notifier will often be the breeder or farmer who developed the OHM. It is also possible that the notification is delegated to a third party, e.g. a seed producer. In any case, **the necessary information for the dossier has to be generated and collected already during the development phase of the OHM.** The task has to be completed before the dossier is filled in and it may take several years to achieve this.

The requested information in the dossier includes according to Article 4 (1) of the Delegated Regulation (EU) No. 2021/1189 (see also section 2.3 for more details) the:

- phenotypic characterisation of the OHM (of key common characteristics as well as its heterogeneity),
- documentation of agronomic and quality traits (including available results from field trials) and the
- description of the breeding process.

Some of this information will be collected during the breeding process itself, but it may require **additional recordings and visual scorings** (e.g. UPOV/CPVO descriptors). For the assessment of the agronomic and quality traits options are to carry out (exact) **field trials** or the OHM candidate may be included in (regional) post-registration trials. Frugal testing schemes may play an important role as they are developed in the WP2 of the LiveSeeding project (see deliverable D2.5: Synthesis of cultivar evaluation case studies, recommendations and follow-up plans; due date April 2026). Depending on the relevant parameters, e.g. to assess specific resistance to abiotic stress or suitability for low input conditions (see section 2.3), additional targeted testing methods can be used.

In many EU Member States the competent authorities provide a form, in which the information for the dossier can be entered. These forms greatly facilitate the notification procedure (see sections 2.4 and 2.5 for examples). Finally, sufficient quantities of PRM for the representative samples must be produced and kept available for the notification.

2. Sending in the dossier

According to Article 13 (2) of the Organic Regulation (EU) No. 2018/848 **the notification dossier shall be sent in by registered letter, or by any other means of communication accepted by competent authority**, with confirmation of receipt requested. The time span of the three months granted to the authority to check the documents will start with the date shown on the return receipt. However, if additional information is requested the time period will be extended by another three months.

As an integral part of the notification, **a representative sample of PRM of the OHM must be delivered** to the responsible bodies. The shipping address is indicated in

publicly available documents, e.g. in France by the Variety and Seed Study and Control Group (GEVES)[5], in Germany by the Federal Plant Variety Office (Bundessortenamt)[6] and in Italy by the Council for Agricultural Research and Economics (CREA). These documents also specify requirements on the representative PRM samples of OHM.

First of all, the PRM samples of OHM must comply with the **requirements on sanitary quality, analytical purity and germination** as they are laid out in Article 6 of the Delegated Regulation (EU) 2021/1189. In particular, these include the provisions of Regulation (EU) 2016/2031 on protective measures against pests of plants.

Second, the **PRM of the representative sample must be organically produced**. In order to demonstrate this, the organic control number of the organic control body (and the farm) should be indicated on the delivery note. This information should be checked by the competent authority. In Germany, the Federal Plant Variety Office requires that the PRM must not have undergone any treatments.[6]

Finally, the **requested quantities for the representative samples for different crop species** are specified by the authorities, often in publicly available lists. Examples from France and Germany are presented in Table 2 below.

Table 2: Examples of requested quantities for the representative PRM (seed) samples in the notification procedure in France and Germany. Lists containing this information are available online.[5,6] The quantities from France should be considered as indicative. In Germany, also a minimum germination of the sample is required, which is added in the last column of the table.

Crop species	Quantity requested in France	Quantity requested in Germany	Minimum germination in Germany
Agricultural species			
Cereals, e.g. barley, rye, wheat	1 kg	1 kg	85%
Maize	5,000 grains	900 g	90%
Rapeseed	250 g	60 g	85%
Mustards	250 g	150 g	85%
Small-grain legumes, e.g. clover, sainfoin, and grasses	-	150 g	80%
Large-grain legumes, e.g. faba bean, lupine, peas	-	600 g, 700 g (pea)	80%, 75% (blue lupine)
Vegetable species			
Carrot	50 g	15 g	65%
Brassicaceae family: Brussels sprouts, cauliflower, Chinese cabbage, headed cabbage	30 g	900 seeds, 1,200 seeds	75%

[5] https://www.geves.fr/wp-content/uploads/echantillons-de-semences-MHB.pdf [last accessed 19th April 2025]

[6] https://www.bundessortenamt.de/bsa/media/Files/Bekanntm/BNr_2221.pdf [last accessed 19th April 2025]

		(Chinese cabbage)	
Melon/water melon	50 g	150 seeds	75%
Tomato	5 g	600 seeds	75%
Vegetable/sweet maize	500 g	300 g	85%
Zucchini	100 g	150 seeds	75%

Overall, the requested quantities are very similar in the two countries, with a tendency to be higher in France. For crop species not contained in the official list, the competent authority shall be contacted in France. In Germany, in that case, the representative sample must only be sent in at the request of the official body. The Federal Plant Variety Office also requires a minimal germination for the representative PRM sample of the OHM (see the last column of Table 2).

3. Acknowledgement of the notification

The notification dossier will be **reviewed by the competent authority**. If the dossier is incomplete, or if it does not comply with requirements of the Organic Regulation (EU) 2018/848[7], the authority can request additional information or even formally reject the notification. In the former case, the three months-time period for checking the documents will be extended by another three months.

If the dossier is positively evaluated the Organic Regulation (EU) 2018/848 foresees that **the notification will be either implicitly or expressly acknowledged by the responsible authority**. In Germany, the Federal Plant Variety Office writes that it always intends to confirm the notification formally.

In France, in order to enable a more comprehensive assessment of the dossier, **a committee surveying the notification process and checking the dossiers** consisting of recognised experts in the field has been set up. Such an approach could be particularly suitable also for smaller Member States, considering that experts from other countries could also serve on the committee.

4. Listing of the cultivar

After the acknowledgement of the notification the competent authority proceeds to the listing of the OHM cultivar. This listing shall be free of charge to the applicant. According to Article 13 (2) of the Organic Regulation (EU) 2018/848 **the listing shall be communicated to responsible bodies from the other Member States and to the European Commission**.

It appears that this communication has not yet been implemented at the time of publication of this report (May 2025). However, the competent authority in France (GEVES) maintains a website with a table presenting notified OHM from the European Union (see section 4.1 for more details):

[7] in the sense of Article 3 (57) of the Regulation

https://www.geves.fr/variety-seed-expertise/organic-agriculture/organic-heterogeneous-material/ [last accessed 20th April 2025]

It is recommended that a European body takes on the task of maintaining and regularly updating a comprehensive list of the notified OHM in the EU.

Information from the notification dossier will be relevant for customers of OHM cultivars. Moreover, evidence from Member States suggests that improved and open access to knowledge on the characterisation and properties of the OHM described in the dossier may help to facilitate the traceability and control systems of the PRM (see section 4). A high level of transparency is generally an important goal in organic agriculture. **It is therefore a recommendation of the LiveSeeding project that the information in the notification dossier should be made publicly available by the competent authority**, e.g. by uploading the content on an official website. The supplier shall be informed before the submission (e.g. through a note on the form) that the information provided in the dossier will be fully disclosed to the public after the acknowledgment of the notification of the OHM.

5. Marketing of the PRM

The **marketing of PRM of OHM is permitted as soon as the three months-period has passed or the notification is expressly confirmed** by the responsible authority. Operators can then place PRM on the market and it is their responsibility that the requirements of the Organic and Delegated Regulations (EU) 2018/848 and 2021/1189 on quality, labelling and packaging of the PRM are fulfilled. Official risk-based, post-marketing controls are important to ensure quality and safety within the seed system. **Traceability** is an additional important building block for the marketing regime of OHM. Concretely, it is required that the supplier and operators **collect and store the information** as described in Box 6. Procedures for implementation are discussed in more detail below.

The legal texts do not clearly state how long the OHM will remain notified. In Germany, the Federal Plant Variety Office and representatives of the organic sector agreed that the notification of a cultivar should initially be granted for 10 years and will then be re-evaluated. During this period, in order to monitor the maintenance breeding (see section 3.4 for more details), the authority may request the supplier to submit another representative PRM sample of the OHM.

Finally, the possibility to **correct information or even terminate the notification of an OHM cultivar** must also be considered. It should always be possible for the competent authority to request necessary corrections of the notification dossier even after the initial three months-period, e.g. if new information on the OHM becomes available or if mistakes are discovered. Moreover, it should be an option for the authority to withdraw the notification of an OHM cultivar if important requirements of the Organic and Delegated Regulations (EU) 2018/848 and 2021/1189 can no longer be met, also

in the case when PRM of the OHM repeatedly violates important provisions of the legislation. The protection and safety of customers is a priority.

Box 6: Information to be kept by the supplier and operators of OHM according to Article 8 of the Delegated Regulation (EU) 2021/1189:

Article 8 (1): The supplier and operators of the OHM must **keep copies of the**:

- **notification dossier** submitted to the competent authorities,
- **declarations made in the context of the organic certification controls** (specified in Article 39 (1) (d) of the Organic Regulation (EU) 2018/848),
- **organic certificate** (of PRM) of the OHM and
- information allowing the **identification of the operators which have supplied parental material** of the OHM.

These documents shall be kept by a minimum of five years. The responsible official body for the OHM notification procedure shall have access to this information.
It is not clear whether Article 8 (1) also refers to operators producing and marketing PRM of the OHM other than the notifier of cultivar. Note that this issue can be partly[8] resolved if the notification dossier is made publicly available by the competent authorities as it is recommended by the LiveSeeding project.

Article 8 (2): Operators producing PRM of OHM intended for marketing shall **keep an accessible and up-to-date register** and record (for each lot of PRM) the:

- species, denomination and the type of technique used for the production (of the PRM) of the OHM,
- phenotypic characterisation of the OHM,
- location of production of the PRM,
- surface area for the production and quantity produced.

2.3 Notification dossier

The notification dossier of an OHM must contain general information on the applicant, the species and proposed denomination as well as a representative sample (see Box 5 in section 2.1). At its heart, however, **the dossier consists of a comprehensive description of the OHM cultivar**.
In fact, **a detailed and precise description forms the basis of a functioning marketing regime for OHM**. Exact information on agronomic and quality characteristics is of great value for customers of OHM too. Moreover, such a description facilitates the traceability as well as official controls systems of the PRM (see section 3.3). An

[8] The information on the parental material of the OHM can really only be plausibly kept by the supplier of the OHM cultivar.

overview of the main elements of the description of an OHM cultivar as they are proposed in the Organic and Delegated Regulations (EU) No. 2018/848 and 2021/1189 is given in Box 7.

Box 7: Description of an OHM cultivar in the notification dossier:

The **main elements of the description** according to the Organic Regulation (OR) 2018/848 and Delegated Regulation (DR) 2021/1189 and references to the relevant articles are summarised in the following table:

No	Element of the description	Article in the OR	Article in the DR
1	**Phenotypic characterisation** of a) key common characteristics b) heterogeneity	13 (2) (c)	4 (1) (a) (i)
2	**Documentation of agronomic and quality traits** (including available test results)		4 (1) (a) (ii) - (iii)
3	**Breeding technique**		4 (1) (b) - (d)
4	**Parental material**		4 (1) (c) - (d)
5	**Country of breeding, year of production, pedo-climatic conditions**		4 (1) (e)

In summary, the phenotypic characterisation as well as the documentation of agronomic and quality traits are the two elements which constitute a 'classic' description of a cultivar. The objective is also to describe the phenotypic heterogeneity of the OHM. The remaining three elements help to **encapsulate the specific properties of OHM**, notably its dynamic nature. Of particular importance in this respect are the elements of the description of the breeding technique, year of production and pedo-climatic conditions.

The elements 3 - 5 in Box 7 also help to guarantee the integrity of OHM as an organic product. This refers in particular to the description of the parental material as well as the breeding technique. It should be emphasized that it is **the elements as a whole that provide reliable information for customers/end-users and allow in that sense the identification of PRM of the OHM** in a particular location and year.

Below we outline **additional detail and guidelines on how the elements of the description** in Box 7 **could be presented** in the notification dossier:

1. Phenotypic characterisation

As already introduced in section 1.1, **phenotypic characteristics proposed by the 'International Union for the Protection of New Varieties of Plants' (UPOV) and/or of the CPVO technical protocols can be used** to describe both key common characteristics as well as the heterogeneity of the OHM cultivar. Guidelines explaining the

assessment of these 'UPOV-traits' exist for the conduct of tests for Distinctness, Uniformity and Stability (DUS) for the relevant crop species. They can be found at: https://www.upov.int/test_guidelines/en/ [last accessed 14th May 2025] and https://cpvo.europa.eu/en/applications-and-examinations/technical-examinations/technical-protocols/cpvo-technical-protocols?page=1 [last accessed 14th May 2025].

In the case of the heterogeneity of the OHM, one option is to indicate the different expressions of UPOV-traits. As quantitative information, also (ranges of) the proportions of each expression can be specified, e.g. that 20-30% of the plants in a wheat OHM are awned.

In the case of key common characteristics, it may be appropriate to use agronomic and quality traits to describe the OHM in addition to UPOV criteria (see also the explanations for element 2 below). Note that from a legal point of view all types of traits (and not only those proposed by UPOV) are available to the notifier.

It is important that the phenotypic characterisation of an OHM is sufficiently detailed and precise. As explained above, such a description forms the basis of a functioning marketing regime for OHM. However, **it should be also taken into account that the OHM will evolve and adapt** to growing conditions at different locations and over time (see section 1.1 for explanations). The characterisation needs to be flexible (and general) enough to allow for these changes.

Therefore, it should be considered to **indicate ranges** for the expressions of UPOV-traits when describing the heterogeneity of an OHM. On the other hand, if an expression of a characteristic is not present at all it may be plausible to assume that it will not appear in the cultivar over time or at different locations. Agronomic and quality traits may also be particularly appropriate descriptors, especially if they represent an average (such as technological baking quality parameters) which may be stabilised by a high genetic diversity when the OHM is grown in different environments (see e.g. Döring et al. 2015 or Vollenweider et al. 2021). It should also be considered, that for OHM characterised by a very high level of heterogeneity (e.g. the FURAT wheat CCP with ca. 2,000 different genotypes), it could be challenging to describe in detail the overall range of traits and their diversity. Especially in these cases the focus should be on the key and most representative traits.

2. Documentation of agronomic and quality traits

Examples of relevant traits are listed in Article 4 (1) (a) (ii) of the Delegated Regulation (EU) 2021/1189. They include:

- agronomic characteristics, e.g. yield, yield stability, suitability for low input systems, resistance to abiotic stress, disease resistance and
- quality parameters: product quality, taste and colour.

Traits of particular value in organic farming may be especially suited for the description of OHM, such as rapid juvenile development or high ground cover contributing to weed competition or nutrient use efficiency.

Whenever possible these characteristics should be **documented with results from field trials or laboratory analysis** (see step "1. Preparation of the notification dossier" in section 2.2). It is important that the design and scope of the field trials are clearly specified. Note that the results should be compared to those of known reference varieties if available, preferably those of official Value for Cultivation and Use (VCU) tests. With regard to the transfer of the data there is usually the option to send the test results as attachments to the notification dossier.

3. Breeding technique

The first information indicated in the dossier should be the **type of breeding technique** used to develop the OHM. As outlined in section 1.1, there are three main categories of techniques available – Composite Cross Populations (CCP), Dynamic Populations (DP) and farmers' selections (FS) – and they mainly entail a different approach to the initial stage of OHM development. Combinations of these options and other kinds of methods are also compatible with the legal framework of the Delegated Regulation 2021/1189 (see Box 2 of section 1.1).

The second important information for the dossier consists of **a clear description of the breeding technique**. For instance, in the case of a CCP the exact crossing protocol needs to be specified and how the progenies were combined (e.g. the quantities and the generation Fn after the crossings when the seeds of the progenies were physically mixed). The timespan, method and criteria of the artificial selection steps should be described for all techniques. **A clear timeline** (i.e. the steps that were conducted in each year of development) will help to understand the description more easily.

Especially in the case of DP-OHM it should be indicated how many generations of bulk propagation were already carried out before the notification of the OHM candidate. Finally, if applicable, it could be stated which type of techniques are foreseen for the multiplication or maintenance of the OHM.

4. Parental material

In the dossier the **denomination as well as the type of parental material** can be described. Possible types of material include

- breeding lines (from organic breeding programs),
- registered varieties,
- gene bank accessions, conservation varieties and landraces which are still in cultivation.

The denomination of the genotypes used to develop the OHM should be unambiguously indicated. Note that the notifier must keep records of the operators who have

supplied the parental material to comply with traceability requirements for OHM (see Box 6 in section 2.2). However, for the notification dossier this information does not need to be included.
The parental material should be free from genetically modified organisms including novel genomic techniques in order to be consistent with the European Organic Regulation (see LiveSeeding Policy Brief 2024).

5. Country of breeding, year of production, pedo-climatic conditions
The idea is to describe the country, year and pedo-climatic conditions where and when the OHM was developed. In addition to the country of breeding the region and even the farm of origin of the OHM may be indicated, especially for OHM of the type farmers' selection (see the example of the notification form from Germany below).
The meaning of the "year of production" can be interpreted differently: One possibility is to specify the last year when the OHM candidate was artificially selected (and after that the material was only propagated as a bulk population subject to natural selection). Another interpretation is to declare the year when the PRM of the OHM was produced that was used in the notification procedure (i.e. also for the reference sample). It is good practice to indicate in the dossier which interpretation was used.
Parameters that can be used to describe soil and climatic conditions may include the soil type and condition, the average annual temperature, precipitation, elevation above sea level (of the location of origin of the OHM) as well as special features of weather patterns (e.g. pre-summer drought).

2.4 Example of a notification form

Competent authorities of several EU Member States provide applicants with a form in order to **facilitate the notification procedure**. In this form the information required in the notification dossier can be entered (see Box 5 and 7 in sections 2.1 and 2.3). **A predefined structure and additional explanations** offer support to the applicant.
In Table 3 below the **form of the German Federal Plant Variety Office** (Bundessortenamt) is described. The form is available since autumn of 2021 and it implements the legal requirements from the Organic and Delegated Regulations (EU) 2018/848 and 2021/1189 (see Box 7 of the previous section 2.3). Note that Table 3 represents only a summary of the form and the form has not been officially translated. The columns in the table contain the official numbering of the entries, a short description of the content, the type of the entry and comments. In section 2.5 below, notification forms from Germany and from other Member States are compared.

Table 3: Notification form of the German Federal Plant Variety Office (Bundessortenamt). Version as of April 2025.

No.	Entry	Type of entry: text box T or options to tick O	Comment
1.	**Contact details of the notifier**: • name • address • phone • email	T	The notifier can be a person or a company.
2.	Address for correspondence (if different from no. 1)	T or O	-
3.	**Botanical species**	T	Indicating the Latin name of the species is sufficient.
4.	**Denomination of the OHM**	T and O	There is the option to indicate that the material was already approved in temporary experiment of the Commission Implementing Decision (EU) 2014/150 on populations of the plant species wheat, barley, oats and maize
5.	Declaration on the registration of the designation as a trade mark	O	There are options to indicate whether the denomination for the same material has been registered (or applied for registration) as a trade mark with the German Patent Office or the International Bureau of the World Intellectual Property Organisation (WIPO) and whether the certification is enclosed or will be submitted within three months.
6.	**Parental material**	T	If applicable, indication of the varieties or genotypes used to create the OHM
7.	**Type of breeding technique**	O	There are three option that can be ticked (see section 2.3): 1. CCP 2. FS or 3. other technique.
8.	**Description of the breeding technique**	T	see section 2.3
9.	**Main phenotypic and agronomic characteristics**	-	Combining elements 1 and 2 of Box 7 in section 2.3, but there are the sub-items 9.1 - 9.5
9.1	**Key common phenotypic characteristics**	T	see section 2.3

9.2	Level of heterogeneity	O	There are three option that can be ticked: low, medium and high
9.3	**Characterisation of the phenotypic heterogeneity**	T	see section 2.3
9.4	**Documentation of relevant agronomic traits**	T	The traits from Article 4 (1) (a) (ii) of the Delegated Regulation (EU) 2021/1189 are explicitly listed in the form, see section 2.3
9.5	Test results for entry no. 9.4	T	It is pointed out that the results can be attached to the form as an annex if necessary
10.	**Country of breeding and region, if applicable**	T	see section 2.3
11.	**Soil and climatic conditions**	T	see section 2.3
12.	**Year of production**	T	see section 2.3
	Attachments (optional)	O and T	There are three options that can be ticked: 1. authorisations for the representative according to entry no. 2, if applicable, 2. test results for no. 9.4 or 3. other attachments.
	Declarations accepted with the signature	-	The undersigned declares that: 1. I/we have taken note of the Federal Plant Variety Office's information on the storage of personal data. 2. I/we declare that the OHM notified with this form has been produced in accordance with the EU Organic Regulation 2018/848. 3. I/we declare that, to the best of my/our knowledge, the information provided in this notification form and in the annexes are complete and correct. I/we request confirmation of the notification of the OHM.
	Note on the representative PRM sample	-	It is stated that a representative seed sample of the OHM must be submitted with the notification. A separate form (printed on the following page) should be used to provide information on the sample. In

			that form information on the germination, thousand kernel weight and the year of production of the PRM must be indicated.

2.5 Comparison of notification forms from different countries

The **competent authorities in the European Union providing notification forms** supporting applicants of OHM **are** the

- Variety and Seed Study and Control Group (**GEVES**) in France,
- Federal Plant Variety Office (**Bundessortenamt**) in Germany,
- Seed Certification Division of the Council for Agricultural Research and Economics (**CREA-DC**) in Italy
- Research Centre for Cultivar Testing (**COBORU**) in Poland

and the Animal and Plant Health Agency (**APHA**) in the United Kingdom. More detailed accounts of the status of the notification procedures in these countries are presented in section 4.

In Table 7 in Annex 2 notification forms from GEVES (France), Bundessortenamt (Germany), CREA-DC (Italy) and APHA (United Kingdom) are compared. It follows from this table that **there are only very few differences between these forms**. **There is only a different arrangement of the entries** (which cannot be inferred from Table 7 due to the reordering that we have carried out), **slightly different descriptions and a few extra fields.**

Country-specific entries in Germany include the possibilities to indicate that

- the OHM candidate was already approved under the Commission Implementing Decision (EU) 2014/150 on a temporary experiment on the "marketing of populations of the plant species wheat, barley, oats and maize" and that
- the denomination is already (or will be) registered as a trademark,

An example of a custom field from the UK is the:

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

Authorities of Member States which have not yet adopted a notification procedure could therefore simply translate the form from one of these countries.

3. Implementing the notification procedure

3.1 Tools for OHM notification

3.1.1 Software tools

Within Work Package 3 of the LiveSeeding project, an open-source platform has been developed to assist breeders, seed producers and traders in managing the notification, traceability and identification of OHM. **The tool, named OHMTrack, has been specifically designed to facilitate OHM notification and traceability processes**. A detailed description of OHMTrack can be found in Deliverable D3.1 "Digital tool for the notification and traceability of OHM seed" (Guidotti & Marchi 2025).

OHMTrack includes specific functions tailored to the following user groups:

- seed producers and breeders:
    - a dedicated interface allows users to create an OHM cultivar and define the location where the seed lots are cultivated and stored
    - users can select a national authority and create a notification of an OHM
    - a **guided form supports the data entry process for the notification** based on a data model that has been cross-checked with current breeding activities (WP1 of LiveSeeding) and is described in the sections 2.4 and 2.5 of this document
    - after submitting a notification, **users can record and trace all the reproduction activities of PRM related to the notified OHM**
- authorities:
    - users can **review the incoming notifications**
    - users can reply to the notifier, either rejecting or accepting the notification
    - after notification, the authority can access the traceability data related to the notified OHM.

OHMTrack includes - or will include in the coming months - **a set of interoperability functions designed to facilitate the data exchange with other tools**:

- **BRAPI**: the data in OHMTrack is available also in the Breeding Application Programming Interface (BRAPI) format. BRAPI is a project that has developed a standard to enable interoperability among agricultural databases and tools;
- **SHiNeMaS**: is a web database developed by INRAE, dedicated to the management of the history of seed lots and the associated data used to track breeding activities. OHMTrack adopts the same data structure as SHiNeMaS enabling data exchange between the two tools using the BRAPI API. SHiNeMaS allows for the complete documentation of the breeding activities needed to create an OHM;

- **SeedLinked**: is an interactive, user-friendly platform that enables decentralized cultivar evaluation designs; OHMTrack allows users to connect with SeedLinked and retrieve test results (e.g. locations, traits data);
- **European Router Database for Organic Seed**: is a tool developed by FIBL that allows a central upload of seed offers across the national organic seed databases; OHMTrack shares crops and OHM vocabularies with the EU database.

One critical aspect of the process of developing OHMTrack is establishing agreements with national authorities and stakeholders on the adoption of the most effective national strategies for the implementation of the notification and traceability requirements of OHM. One possible solution would be the creation of a digital notification data format that can be used as a best practice to standardise the notification data and to support the creation of an EU database for notifications.

Using the approach of the EU Router database, it is envisioned that each country could consider one of the following options:

- **adopt OHMTrack as the standard tool:** countries may choose OHMTrack for submitting notification data and managing traceability, ensuring consistency across the EU;
- **use compatible national tools:** countries could maintain their own national tools for data storage. It will be crucial to assess how these systems can be compatible with common standards to enable interoperability at the EU level.

It is important to highlight that the tools must support data entry through both web interfaces and interoperability API. This will prevent the need for users who already employ software for seed traceability from re-entering the same data.

In the coming months, within WP3 and WP9 of the LiveSeeding project, the interoperability functions will be further developed, to define optimal strategies for ensuring proper OHM notification and traceability. The final results of this activity will be described in D9.1 "Report on internal and external interoperability of LiveSeeding digital tools" (month 48, September 2026).

3.1.2 LIVESEED toolbox

Within the LIVESEED project, which preceded LiveSeeding, an extensive consultation process was conducted with breeders, those working with OHM/HM and policy makers. This resulted in the development of a **"toolbox" for the description and identification of OHM**. It is available for reference at: https://liveseed.eu/wp-content/uploads/2020/10/LIVESEED_D2.8_Toolbox-on-heterogeneous_materials.pdf [last accessed 19th May 2025].

Briefly, the work highlighted the **key tools** that notifiers and authorities should consider when developing, registering and tracing OHM to be:

- origin

- region of cultivation
- breeding methods
- phenotypic traits
- traceability of lots of PRM/seeds.

These factors constitute the regulatory framework described in this report (in particular in sections 2.3 and 2.2). However, **the "toolbox" approach emphasizes how the relevance of these factors may vary depending on the type of OHM being considered** (for more details see the LIVESEED report cited above).

Alongside the regulation, and development of traceability tools such as OHMTrack, we should also take into account what the practical limitations and opportunities presented by the application of such tools are. This may be within the notification process but is also important within the framework of OHM PRM production and maintenance. These factors are explored in further detail below.

3.2 Results of a LiveSeeding survey on OHM notification

A **survey was conducted among plant breeders to assess the current status of OHM and the notification procedure in several EU Member States.** Respondents to the **in-depth interviews** included OHM breeders from countries with more experience (such as Italy and Germany) as well as those from Member States where the notification procedure has only recently been implemented (such as France and Poland) or where few or no notifications have been initiated so far (e.g. Hungary and Spain). **The results highlight positive experiences across Europe and also suggestions for improvements.**

In some countries, OHM is well accepted by the public, has taken its (though minor) place in agricultural production and has successfully entered the market. One example for this is **Italy**, one of the most engaged countries in the field, where, however, the relevant legislation was still in course of adoption at the time of the interview (in the meantime a Ministerial decree was signed in December 2024)[9].

Another positive example is **Germany**, where the implementation of the OHM notification procedure has progressed well and smoothly and a broad range of OHM has already been notified. However, there is still no unified procedure for the official PRM controls in place, as the responsibilities and arrangements vary between different Federal states. In many cases, official authorities lack practical experience with OHM.

[9] https://www.crea.gov.it/documents/63509/2215922/MASAF-2024-0641978-decreto-MEB_signed_signed.pdf/bfa0e3d9-1689-5383-0ebf-9bbf9d2be39e?t=1734342964567 [last accessed 19th May 2005]

Stakeholder discussions and a political discourse to support engagement and training could help address these challenges.

In **Poland** and **France** OHM notification procedures have been implemented. The responsible authorities are COBORU (the Polish National Plant Variety Office) and GEVES (the Variety and Seed Study and Control Group), respectively. In France, the LiveSeeding project is contributing to data collection efforts to facilitate future submissions and processes. In **Spain**, an officially approved procedure for OHM notification is still missing.

In **Hungary** the aim is to develop an OHM notification procedure which involves a simple application with minimal bureaucracy. However, due to the lack of real cases (applications) the official authority has limited practical experience and no established procedure is in place. Closer collaboration with the competent authority may be necessary to develop appropriate protocols and encourage applications from all stakeholders involved in OHM.

The **common challenge identified in the survey regarding guidelines for the notification procedure, including available protocols and templates for notification forms, are addressed in this report.** It can also, to some extent, address the challenge of a lack of experience on the part of the official authorities assuming that it is accessed by these authorities.

In addition to the challenges related to the official notification procedure, there were also important **concerns** pointed out in the survey **about the seed quality of candidate OHM, including low germination rates and phytosanitary risks**. For some crops, phytosanitary checks would be essential – for example, in wheat, due to the high risk of common bunt infections (see section 3.3). Another concern relates to the traceability of notified OHM as unauthorized seed use or the appearance of poor-quality OHM on the market might damage the public reputation of OHM overall. There are also challenges in relation to dispersed farmer networks engaging with official notification and post-marketing, risk-based controls if they are not familiar with policies and procedures and do not have the support or resources of more experienced breeders or seed companies (relevant experience from Austria in that respect is presented in section 4.6).

3.3 Post-marketing, risk-based controls of PRM of OHM

The legal basis for establishing risk-based controls is set out in the Delegated Regulation on OHM supplementing the EU Organic Regulation:

Box 8: Official controls (Article 9 of the Delegated Regulation (EU) No. 2021/1189; emphasis added):

"The competent authorities of the Member States or the delegated bodies, where the competent authorities have delegated control tasks in accordance with Chapter III of Title II of Regulation (EU) 2017/625, **shall carry out risk-based official controls in relation to the production and marketing of PRM of OHM** to check compliance with the requirements of Articles 4, 5, 6, 7, 8 and 10 of this Regulation.

The testing of germination and analytical purity shall be carried out in accordance with the applicable methods of the International Seed Testing Association."

The **requirements concerning the sanitary quality, analytical purity and germination of PRM of OHM are laid out in Article 6 of the Delegated Regulation 2021/1189.**

In particular, according to Article 6 (1):

"PRM of OHM shall comply with the provisions of Regulation (EU) 2016/2031, Commission Implementing Regulation (EU) 2019/2072 (16) and the other relevant acts adopted pursuant to Regulation (EU) 2016/2031 concerning the presence, and the measures against, Union quarantine pests, protected zone quarantine pests and Union regulated."

The regulatory flexibility provided for by the legal framework of OHM is essential to maintain diversity in the seed supply chain and facilitate the practical use of OHM. However, it also implies a need for enhanced **post-marketing oversight of seed/PRM of OHM to avoid quality risks, including low germination or phytosanitary risks, and to ensure consumer trust in OHM-based systems.**

The survey conducted within the LiveSeeding project among breeders in the EU on the current status of OHM highlighted seed quality concerns related to various OHM crops. These include the high risk of seed infestation with *Tilletia* and/or *Ustilago* species (e.g. in soft and durum wheat or barley; see also Box 8 below), occasional *Fusarium* infections (in soft and durum wheat, rice, and maize), the possible presence of smut in maize (*Mycosarcoma maydis*, formerly *Ustilago maydis*), ergot (*Claviceps purpurea*) in rye and viral infections in tomato and pepper.

These phytosanitary risks will be addressed through seed health testing, as per the delegated regulation, and – where applicable – through regular field monitoring and by using resistant materials as crossing parents. Best practices at the field level include appropriate crop rotations and adherence to the principles of Integrated Pest Management (IPM). In seed processing selection based on seed size or optical sorting, hot water treatment, brush cleaning, seed coating and other biological control methods may be applied.

Box 9: Common Bunt in Wheat Organic Heterogeneous Material (OHM)

Pathogen: *Tilletia caries* and *Tilletia laevis*. Most commercially available wheat cultivars lack (full) resistance (with the exception of a number of organically bred cultivars in Denmark and Germany), so emphasis must be laid on precaution.

Impact: Common bunt reduces yield and damages grain quality. The bunt fungi produce the organic compound *Trimethylamine*, which is associated with a "fishy" odour.

Disease cycle: Millions of spores per infested head may be released at harvest, which contaminate healthy kernels and the soil where they can persist for years. The disease is initiated when soil-borne but mainly seed-borne teliospores germinate together with the wheat seedlings in response to moisture and produce hyphae that infect the germinating plants. The fungus proliferates in the spikes; converting entire grain kernels into bunt sori ("bunt balls") consisting of dark brown to black mass of teliospores.

Environment: Cool soil temperatures (5 to 10 °C) favour infection

Disease control - **In the field:** Regular *field inspections* are recommended. *Crop rotation* - avoid wheat monoculture (susceptible is the whole wheat family) to disrupt disease cycles. In case of infection, no susceptible crop species should be cultivated for a minimum of five years. Since UV radiation and other environmental factors reduce the viability of fungal spores, leaving crop stubbles unincorporated on the surface until the next sowing can significantly reduce soil re-infestation.

OHM, which are intended to be repeatedly resown so that adaptation and evolution can take place, may be particularly vulnerable to the disease due to the accumulation of the disease pressure. Another reason is that only partial resistance within an OHM against common bunt (with some susceptible plants in the population) is usually not sufficient to avoid the disease. Thus, special attention must be paid, and regular seed checks must be applied to prevent a building up of the infestation within the material through subsequent generations. **Seed treatment**: mechanical (brush) or hot water treatment and other permitted seed treatments in organic farming (e.g. vinegar, seed coating with microbiota (e.g. *Trichoderma sp.*) may be used to decrease infection risks.

However**, OHM with high levels of resistance to common bunt have been developed by organic crop breeders** in Denmark and Germany. The cultivars are available and successful on the market. With these OHM it became possible to establish a reliable disease (and in particular common bunt) management for farmers as well as seed producers.

3.4 Maintenance breeding of OHM

The legal basis is laid out in the Delegated Regulation on OHM:

Box 10: Maintenance breeding (Article 10 of the Delegated Regulation (EU) No. 2021/1189; emphasis added)

Where maintenance is possible, **the operator who has notified the OHM** [...] **shall preserve the main characteristics of the material at the time of its notification, by maintaining it as long as it remains on the market**. That maintenance shall be undertaken according to accepted practices adapted to the maintenance of such heterogeneous material. The operator responsible for the maintenance shall keep records of duration and content of maintenance.

At all times, the competent authorities shall have access to all records [...]. The operator shall keep those records for five years after the moment the PRM of OHM is not marketed anymore.

Breeders responding to the survey mentioned above agreed that the maintenance of OHM is a challenging task, especially considering that these materials can evolve and adapt over time and to different locations. The exact composition of the OHM may change genetically and phenotypically. It is important to understand that the maintenance of an OHM does not mean that the cultivar should not change. **A more appropriate definition implies that only the key common characteristics of the OHM shall be preserved** as well as the degree of heterogeneity.

One key issue during maintenance concerns the **minimal number of individuals required to preserve the genetic diversity of the OHM** while simultaneously allowing for natural or artificial selection to occur. Brumlop et al. (2019) (see also Goldringer et al. (2001)) suggest that for practical purposes wheat OHM should be maintained on at least 150 m^2 (and that an effective populations size of at least 5,000 individuals should be guaranteed corresponding to an actual or census population size of about 15,000 plants). Note that the number of required plants for the maintenance of OHM also for outcrossing species (such as maize or sunflower) will be usually higher than those of more homogeneous (standard) open-pollinated varieties due to its generally higher degree of genetic diversity.

Another critical aspect is the **elimination of off-types and different species.** Regular negative selection is advised to eliminate such individuals and a crop rotation interval of at least four years is recommended to minimize the risk of contamination with different varieties, which may be particularly difficult to detect and remove in OHM. Note that to preserve the genetic diversity of the OHM, **seed cleaning must be performed with care**, taking into account the naturally occurring diversity in seed size, shape, and colour.

4. Experience from different countries

4.1 Overview of notified OHM in Europe

Cultivars of Organic Heterogeneous Material (**OHM**) **are currently notified in eight Member States of the European Union**. It is also in these countries that a notification procedure as defined in the Organic Regulation (EU) 2018/848 has been implemented. **OHM is notified for a growing number of crop species**. As of April 2025, when this deliverable was finalised, these included seven agricultural species: barley, faba bean, maize, rice, rye, sunflower and wheat, including durum and Khorasan wheat. In addition, there are notified OHM of nine vegetable species: among them are aubergine, common beans, lettuce, pepper, tomato and zucchini.

Table 4 summarises the number of notified OHM in different European countries, information on the crop species and growing area.

Table 4: Overview of officially notified OHM in Europe, specifying the country where OHM are notified, number of notified OHM per country, crop species as well as the number of OHM per crop species and the growing area in the vegetation period 2023/24.

Country	Notified OHM [n]	Crop species	Growing area 2024 [ha]
FR	1	Wheat (*Triticum aestivum* L.)	
DE	15	Faba bean (*Vicia faba* L.; 1), maize (*Zea mays* L.; 6), rye (*Secale cereale* L.; 4), wheat (*Triticum aestivum* L.; 4)	> 800
IT	12	Barley (*Hordeum vulgare* L.; 1), maize (*Zea mays* L.; 1), wheat (*Triticum aestivum* L.; 5), durum wheat (*Triticum durum* Desf.; 1), Khorasan (*Triticum turanicum* Jakubz.; 1), rice (*Oryza sativa*, L.; 1), sunflower (*Helianthus annuus* L.; 1), zucchini (*Cucurbita pepo* L.; 1)	
PL	5	Maize (*Zea mays* L.; 4), black radish (*Raphanus sativus subsp. niger var. niger* J.Kern)	
AT	2	Rye (*Secale cereale* L.), wheat (*Triticum aestivum* L.)	< 100
CZ	8	Tomato (*Solanum lycopersicum* L.; 2), zucchini (*Cucurbita pepo* L.; 1), pepper (*Capsicum annuum* L.; 1), lettuce (*Lactuca sativa* L.; 1), common bean (*Phaseolus vulgaris* L.; 1), aubergine (*Solanum melongena* L.; 1), maize (*Zea mays* L.; 1)	?
DK	2	Wheat (*Triticum aestivum* L.)	> 450
SI	4	Common bean (*Phaseolus vulgaris* L.; 2), runner bean (*Phaseolus coccineus* L.), spinach, beet or chard (*Beta vulgaris* L.)	

UK	1	Wheat (*Triticum aestivum* L.).	
EU	49		> 1,200
Europe	50		> 1,200

More details on the cultivars can be found in Annex I and a list published by the French authority GEVES: https://www.geves.fr/variety-seed-expertise/organic-agriculture/organic-heterogeneous-material/ [last accessed 29th April 2025].

In total **there are 49 officially notified OHM cultivars in the European Union as of April 2025 from eight Member States and of 16 crop species** as indicated above (see Table 4). The OHM comprise a variety of different types, including Composite Cross Populations, Dynamic Populations and Farmers' Selections (see Box 2 in section 1.1 for explanations). As a genetic basis breeding lines from organic breeding programs were used, e.g. in Denmark and Germany to develop successful winter and spring wheat Dynamic Populations with excellent baking quality and disease resistance, but also landrace varieties. The wheat and rye OHM in Austria created and maintained by farmers are suitable for very specific growing conditions in mountain regions as the name 'Berglandroggen' ('mountain region rye') suggests.

Value chains for OHM have been established with maize, rye and wheat **OHM growing** already **on more than 1,000 hectares in Denmark, Germany and Austria** in the vegetation period 2023/24 (see Table 4 and section 4.10 for more details). It should be emphasised that organic breeders, seed producers, farmers, traders and processors depend on these markets for their income. In some cases, dedicated value chains with a focus on direct marketing have been started: Artisanal bakers in Germany demand the special quality of wheat and rye OHM and with vegetable OHM there is great potential to focus on quality traits, taste, local adaptation and robustness for organic cultivation.

The notification procedure is generally **recognised as an efficient system for regulating the market access of OHM** cultivars in different countries. **Challenges** in Member States **are mainly associated with** the marketing of PRM and the implementation of **the risk-based, post-marketing control system**. Open questions concern the allocation of responsibilities (in particular between the PRM certification and organic control authorities), costs and additional requirements (see sections 4.2 - 4.9 where experiences from different European countries are summarised). Targeted recommendations to address these challenges will be presented in section 5 of this deliverable.

4.2 France

Organisation providing the information (within the LiveSeeding project):
GEVES (Groupe d'Etude et de Contrôle des Variétés et des Semences)
Contact person: David Hidrot, Head Manager - Cavaillon GEVES unit / Organic Agriculture

1. General information

No.	Question	Short Answer (Yes, No, Number of OHM, cost in €)	Comment
1.	Is a **procedure (or any possibility) for OHM notification** established in your country?	Yes	https://www.geves.fr/variety-seed-expertise/organic-agriculture/organic-heterogeneous-material/ [last accessed 23rd April 2025]
2.	Is there an **official form for OHM notification** available?	Yes	https://www.geves.fr/wp-content/uploads/Application-form-of-0rganic-Heterogeneous-Material.docx [last accessed 23rd April 2025]
3.	Which is the **official body responsible for OHM notification** (sensu Art. 13 of 2018/848/EU) in your Member State?	French Ministry of Agriculture and Food	GEVES studies the application and the French Ministry of Agriculture and Food makes the official notification
4.	**How many OHM are notified** in your member state? For which crop species?	1 (+1 in progress)	1 winter wheat (+ 1 melon)
5.	What are the **costs for the notification** of OHM (i.e. the fees of the official body)?	0 €	Free of charge
6.	Is there the **obligation (or possibility) to deposit a representative PRM sample of the OHM** together with the notification documents?	Yes	Deposition of a seed sample is compulsory
7.	Is there a procedure for **risk-based official controls** of the production and marketing of plant reproductive material (PRM) of OHM in your country? (as foreseen in Art. 9 of the delegated regulation (EU) 2021/1189)	Yes	
8.	Which is the **competent authority** (or delegated body) **carrying out the risk-based official controls** of the production and marketing of PRM of OHM?	SEMAE	
9.	Are there **field inspections for OHM** (carried out in the course of the risk-based official controls of PRM of OHM)?	Yes	

10.	What are the **costs of the risk-based controls** of PRM of OHM (compared to certification costs of standard varieties)?	-	

2. Description of the situation with OHM notification

In 2022, the French Ministry in charge of Agriculture designated GEVES as the competent authority for handling OHM notifications.

The dedicated Organic Agriculture commission of GEVES quickly set up a specific email address (notification.mhb@geves.fr) and developed a technical questionnaire enabling applicants to submit their request directly via the GEVES website. Upon receipt of an application – including a seed sample and a denomination – the request is reviewed by a species-specific expert group. Depending on the content of the application additional technical information may be requested from the applicant. Within a few weeks GEVES issues an expert opinion and informs the French Ministry of Agriculture, which then proceeds with the official notification of the new OHM. The Ministry forwards this information to the relevant European authorities.

A list of notified OHMs in France and across the European Union is available at the following this link.

4.3 Germany

Organisation providing the information (within the LiveSeeding project):
Dottenfelder Bio-Saat, Bad Vilbel

Contact person: Maike Bender, Organic Plant Breeder

1. General information

No.	Question	Short Answer (Yes, No, number of OHM, cost in €)	Comment
1.	Is a **procedure (or any possibility) for OHM notification** established in your country?	Yes	https://www.bundessortenamt.de/bsa/en/seeds/organic-heterogeneous-material [last accessed 23rd April 2025]
2.	Is there an **official form for OHM notification** available?	Yes	https://www.bundessortenamt.de/bsa/en/form-notifizierung-oehm [last accessed 23rd April 2025]
3.	Which is the **official body responsible for OHM notification** (sensu Art. 13 of 2018/848/EU) in your member state?	-	Federal Plant Variety Office (Bundessortenamt)

4.	**How many OHM are notified** in your member state? For which crop species?	15	2 winter wheat, 2 spring wheat, 6 maize, 4 rye, 1 faba bean https://www.bundessortenamt.de/bsa/media/Files/Saatgut/P1_OHM_liste_en.pdf [last accessed 23rd April 2025]
5.	What are the **costs for the notification** of OHM (i.e. the fees of the official body)?	0 €	The notification is free of charge
6.	Is there the **obligation (or possibility) to deposit a representative PRM sample of the OHM** together with the notification documents?	Yes	Representative seed samples of the OHM must be submitted with the notification. https://www.bundessortenamt.de/bsa/media/Files/Bekanntm/BNr_2221.pdf [last accessed 24th April 2025]
7.	Is there a procedure for **risk-based official controls** of the production and marketing of plant reproductive material (PRM) of OHM in your country? (as foreseen in Art. 9 of the delegated regulation (EU) 2021/1189)	(Yes)	There are procedures in place in some Federal States.
8.	Which is the **competent authority** (or delegated body) **carrying out the risk-based official controls** of the production and marketing of PRM of OHM?	-	In the Federal State of Hesse: it is the PRM certification body.
9.	Are there **field inspections for OHM** (carried out in the course of the risk-based official controls of PRM of OHM)?		Field inspections (and PRM testing) are offered in the Federal of Hesse.
10.	What are the **costs of the risk-based controls** of PRM of OHM (compared to certification costs of standard varieties)?		In the Federal State of Hesse costs for the field inspections are charged on an hourly basis. (Therefore the costs of controls of OHM can be higher than the certification of standard varieties).

2. Description of the situation with OHM notification

1. Description of the initial situation before the EU organic regulation 2018/848 came into force on 1st January 2022, in particular the **experience gained within the temporary experiment (EU) 2014/150 on cereal populations:**

   Heterogeneous populations of winter wheat, spring wheat and maize were already developing and marketed within the framework of the Commission Implementing Decision (EU) 2014/159. Extensive field trials were carried out in national and European research projects, also in collaboration with the Federal Plant Variety Office (Bundessortenamt). In the case of

maize (https://maispopulationen.org/, last accessed 24th April 2025), trials were conducted at 5-6 conventional and 3 organic locations from 2017 – 2021. 3 hybrid reference varieties and 9 populations were tested and grain yields and other agronomic and quality characteristics were recorded.

In the interim period between the end of the temporary experiment and the date when the Organic Regulation (EU) 2018/848 came into force (i.e. from 1.3.2021 to 31.12.2021) it was agreed with the Federal Plant Variety Office that seed of the populations up to the maximum amount permitted by the experiment could still be marketed (there was a corresponding provision in the German implementation of the temporary experiment on which this agreement was based).

2. Description (of the **process)** of **how the framework for the notification procedure was implemented:** e.g. exchange with stakeholders, agricultural ministry, …

   Stakeholder exchanges were organised by the Federal Plant Variety Office with representatives of organic and breeding organisations. The framework was implemented by Bundessortenamt and it was in place at the end of 2021 so that OHM could already be notified at the beginning of 2022.

3. **Description of the notification procedure and its main elements**, e.g. the responsible official body, available forms (and its elements.), …

   OHM can be notified at any time of the year. The official form of the Federal Plant Variety Office must be used and, depending on the crop species, a representative PRM sample of the OHM must be provided. The notification will be expressly confirmed by the Federal Plant Variety Office.

   More details on the notification procedure in Germany are describe in sections 2.1 - 2.4 of this deliverable and there is Announcement No. 22/21 of the Federal Plant Variety Office of 1st December 2021 on the "Notification of OHM" (in German): https://www.bundessortenamt.de/bsa/media/Files/Bekanntm/BNr_2221.pdf [last accessed 24th April 2025].

4. Provide **information on the notified OHM**: number of notified materials, crop species, …

   There are 15 notified OHM in Germany (as of April 2025) of the following botanical species: faba bean (1), maize (6), rye (4), wheat (4). Two of the wheat OHM are of winter and two of spring type.

5. **Experience gained with OHM notification: What worked well?** Feedback from breeders, seed multipliers/farmers, …

OHM represents a completely novel category of cultivars. The legal framework of the Organic Regulation (EU) 2018/848 allows for the first time the marketing of genetically heterogeneous populations that do not fulfil DUS-criteria.

The different elements of the notification procedure seem to allow an adapted characterisation of OHM cultivars. Of particular relevance for organic farming are the description of agronomic and quality traits of the material.

In many instances OHM was notified which was already registered as populations within the temporary experiment (EU) 2014/150. However, it is important to note that the definition of OHM is more general than that of the populations from the experiment (the exception is the requirement that PRM of OHM must be organically produced). In particular, there are now 5 notified OHM of the crop species rye and faba bean which were not included in the temporary experiment. Moreover, dynamic populations (of breeding lines) offer interesting new perspectives, especially for organic breeding initiative to develop suitable cultivars for organic farming.

6. **Experience gained with OHM notification: Possible bottlenecks and challenges**

There could be a stronger focus on properties and considerations of particular importance for the organic sector. The corresponding properties (i.e. weed suppression, horizontal resistances, …) could be highlighted in the notification form. In the case of the representative PRM sample it should be checked whether the PRM was indeed organically produced (see the comments in section 2.2).

There may also be traits which represent an (agronomic) challenge for the OHM concept. A focus also on these traits (again they could be highlighted in the notification form) may be important for organic farmers and processors. Examples of these traits are susceptibility to certain seed-borne diseases or certain quality traits.

The overall objective of additional measures should be to increase trust in (the concept of) OHM. No inadequate OHM should be placed on the market.

7. Analogous questions (as in 6.) for the **risk-based controls for the production and marketing of PRM of OHM**.

The risk-based, post marketing controls for PRM of OHM are implemented differently depending on the Federal State. In the Federal State of Hesse the PRM certification body is responsible for these controls. (Or more precisely, they are responsible for all the specifically PRM-related aspects of the controls. The organic control authorities will check e.g. documents according to Article 8 of the Delegated Regulation (EU) 2021/1189, see Box 6 in section 2.2 for a more detailed explanation).

The implementation in the Federal State of Hesse could serve as a model for a nationwide and standardised system. The advantage is that the PRM certification body has the required

expertise in PRM monitoring. Field inspections as well as (options for) PRM testing are offered.

4.4 Italy

Organisation providing the information (within the LiveSeeding project):
CREA-DC (Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria - Centro di ricerca Difesa e Certificazione)
Contact persons: Giorgia Spataro, Anna Pia Maria Giulini, Pier Giacomo Bianchi

1. General information

No.	Question	Short Answer (Yes, No, number of OHM, cost in €)	Comment
1.	Is a **procedure (or any possibility) for OHM notification** established in your country?	Yes	The procedure was defined by national decree of 5th December 2024. **Please note that the procedure established by this decree is related only to seed propagated species regulated by legislation on seed production and marketing.**
2.	Is there an **official form for OHM notification** available?	Yes	
3.	Which is the **official body responsible for OHM notification** (sensu Art. 13 of 2018/848/EU) in your member state?	CREA	CREA was charged as the authority dealing with the examination of OHM notification and controls on seed production according to reg. (EU) 2011/1189
4.	**How many OHM are notified** in your member state? For which crop species?	n. 12	Barley (1), corn (1), wheat (5), durum wheat (1), korasan (1), rice (1), sunflower (1), zucchini (1)
5.	What are the **costs for the notification** of OHM (i.e. the fees of the official body)?	€ 0	The application cost is now zero.
6.	Is there the **obligation (or possibility) to deposit a seed sample of the OHM** together with the notification documents?	Yes	The national decree foresees that the applier shall provide a reference sample to CREA-DC.
7.	Is there a procedure for **risk-based official controls** of the production and marketing of plant reproductive material (PRM) of OHM in your country? (as foreseen in Art. 9 of the delegated regulation (EU) 2021/1189)	No*	*For the next two years, we have planned to carry out controls on all of the notified OHM in order to collect data and consequently have enough experience to evaluate the risks and their probability.
8.	Which is the **competent authority** (or delegated body) **carrying out the risk-**	CREA	

	based official controls of the production and marketing of PRM of OHM?		
9.	Are there **field inspections for OHM** (carried out in the course of the risk-based official controls of PRM of OHM)?	Yes, from this season on	For the next two year, CREA has planned to carry out field inspections on all of the notified OHM in order to collect data and consequently have enough experience to evaluate the risks and their probability.
10.	What are the **costs of the risk-based controls** of PRM of OHM (compared to certification costs of standard varieties)?	€ 0	The estimation of costs will be available at least after two years of inspection and controls. However, we think they will be not far from the cost for field inspection and control for conventional varieties (€ 4,30/ha, with a minimum of € 12,80).

2. Description of the situation with OHM notification

1. Description of the initial situation before the EU organic regulation 2018/848 came into force on 1st January 2022, in particular the **experience gained within the temporary experiment (EU) 2014/150 on cereal populations.**

   Italy made experience on seed production and marketing of cereal populations according to Dec. 2014/150/EU from the beginning to the end of the 7-year period of the temporary experiment. During this period, sixteen populations of cereal were produced and marketed. CREA-DC carried out field inspections and post controls (sowing of comparative plots coming of seed sample from different years of production). After the end of the temporary experiment, the Italian Ministry for Agriculture, allowed an extension period for the marketing of cereal population seed, until publication of the OHM ministerial decree and guidelines for notification.

2. Description (of the **process)** of **how the framework for the notification procedure was implemented:** e.g. exchange with stakeholders, agricultural ministry, …

   The National Decree of 5/12/2024 was drafted by the Ministerial Office competent on organic production and CREA-DC, with the agreement of breeders, organic stakeholder and associations.

3. **Description of the notification procedure and its main elements**, e.g. the responsible official body, the template (and its elements), PRM samples, …

   The National Decree of 5/12/2024 establishes that:

   - Ministry of agriculture is the competent authority for the application of the National decree.
   - CREA is the authority responsible for the evaluation the OHM notification (including the request of further information of the adoption of the deny decisions) and for the implementation of official controls according to reg. (EU) 2021/1189.
   - The notification applicant shall be organic companies, farms, etc. according to reg. (EU) 2018/848.

- The maintainer, where different by the applicant, shall be also an organic company, farms, etc. according to reg. (EU) 2018/848.
- The applicant shall provide CREA-DC with a reference sample of the OHM.
- The applicant shall fill in the notification form. In attachments the OHM shall be described in as much detail as possible of the required information

4. Provide **information on the notified OHM**: number of notified materials, crop species, …
   Up to now, n. 11 OHM has been notified according to Reg. (EU) 848/2018 and n. 1 according to National decree of 5/12/2024.
   The Ministry and CREA-DC decided to ask the applicants to fill in the form of the national decree even for those notifications applied before the entering into force of the national decree itself. These applicants were asked to provide integrations to the previously submitted notifications.
   In addition, stakeholders were informed to apply according to the national decree also for the cereal population already marketed according to the temporary experiment.
   Therefore, we expected that the number of the notified OHM will increase in the next weeks up to about n. 30 OHM (thanks to n.16 cereal populations, as mentioned in point 1.)

5. **Experience gained with OHM notification: What worked well?** Feedback from the official body, breeders, maybe also seed multipliers/farmers, …
   The main issue is represented by the very short information provided, especially those concerning the description of parental lines, the breeding techniques and the selection schemes used, the description of the OHM, its agronomic value, the environmental adaptation, the advantages for the organic production and all the other elements foreseen by article 4 of regulation 2021/1189. Up to now, most of the applicants have not ever provided publications or other documents supporting their claims/declaration in the application. We think that this kind of information is essential for the notification approval process, because this is based only on a documental verification.

6. **Experience gained with OHM notification: Possible bottlenecks and challenges**
   The bottlenecks are connected to the lack of experience on the procedure both for CREA and the applicants. The topic is totally new for all the parts. We think, however, that after a first period of training, the notification procedure will be very easy and quickly completed.

7. Analogous questions as above for the **risk-based controls for the production and marketing of PRM of OHM**.
   As mentioned above, we need to collect data in order to identify the risks and the probability for them to occur. The possibility of requesting a field visit/inspection has been discussed. Furthermore, seed production also falls in the case of OHM under the phytosanitary regulation procedures (e.g. crop-specific protocols are required).

4.5 Poland

Organisation providing the information (within the LiveSeeding project): Research Centre for Cultivar Testing (COBORU)

Contact persons: Edward Gacek, Tomasz Lenartowicz

1. General information

No.	Question	Short Answer (Yes, No, number of OHM, cost in €)	Comment
1.	Is a **procedure (or any possibility) for OHM notification** established in your country?	Yes	According to regulations, the list of OHM is maintained by the Research Centre for Cultivar Testing (COBORU); the procedure was implemented in accordance with the specific provisions of Regulation (EU) 2018/848 of the European Parliament and of the Council as well as with the delegated act adopted pursuant to that Regulation.
2.	Is there an **official form for OHM notification** available?	Yes	There is a model application - NOTIFICATION - application for entry of the plant reproductive material to THE ORGANIC HETEROGENEOUS MATERIAL list, available at: https://coboru.gov.pl/en/ohm/ohm [last accessed 26th April 2025]
3.	Which is the **official body responsible for OHM notification** (sensu Art. 13 of 2018/848/EU) in your member state?	-	Research Centre for Cultivar Testing (COBORU)
4.	**How many OHM are notified** in your member state? For which crop species?	5	See: https://coboru.gov.pl/en/ohm/ohm_list [retrieved 26th April 2025]; There are 4 maize OHM notified: Hańcza in December 2023, Ukiel, Isąg and Notyst in November 2024.1 black radish (*Raphanus sativus* L.) Axona was notified in April 2025.
5.	What are the **costs for the notification** of OHM (i.e. the fees of the official body)?	-	There are no costs
6.	Is there the **obligation (or possibility) to deposit a PRM sample of the OHM** together with the notification documents?	Yes	Together with the submission of the application, the applicant shall deliver a representative sample of plant reproductive material
7.	Is there a procedure for **risk-based official control**s of the production and marketing of plant reproductive material (PRM) of OHM in your country? (as foreseen in Art. 9 of the delegated regulation (EU) 2021/1189)		It is not the responsibility of COBORU
8.	Which is the **competent authority** (or delegated body) **carrying out the risk-**		State Plant Health and Seed Inspection Service

	based official controls of the production and marketing of PRM of OHM?		
9.	Are there **field inspections for OHM** (carried out in the course of the risk-based official controls of PRM of OHM)?		
10.	What are the **costs of the risk-based controls** of PRM of OHM (compared to certification costs of standard varieties)?		

2. Description of the situation with OHM notification in your country

The four maize OHM are marketed (in spring 2025) as silage maize, mainly to the conventional market, see e.g.

https://centrumnasionpietrzak.pl/produkt/kukurydza-notyst/

https://rolmarket.pl/nasiona-kukurydzy/kukurydza-kiszonkowa-notyst-wysoki-plon-odpornosc-doskonale-parametry-jakosciowe-worek-50-tys-nasion

https://ppseeds.pl/sklep/produkty/kukurydza-notyst-bio/ (*)

[all websites: last accessed: 26th April 2025]

The maize OHM are (mostly) marketed in small packages (with a max. net mass of 30 kg for cereals) for which it is argued from Art. 7 (5) of the Delegated Regulation (EU) 2021/1189 that "packages and containers may be sold to final users in unmarked and unsealed packages up to the maximum quantities provided for in Annex II, provided that, on request, the purchaser is informed in writing at the time of delivery about the species, the denomination of the material and the reference number of the lot." For most offers it is neither indicated that these are seeds of OHM (using this phrase and a yellow label with a green diagonal cross) nor are the OHM seeds labelled as organically certified (but see the offer denoted by a * above). The LiveSeeding project-partner PIN (Polish Seed Trade Association) estimates a high market potential of maize OHM.

The labelling, marketing arrangements and official PRM controls of the maize OHM must be critically evaluated. A combination of measures should be proposed to ensure the protection of customers and the integrity of OHM value chains (see section 5 – conclusions).

4.6 Austria

Organisation providing the information:
Arche Noah (https://www.arche-noah.at/ [last accessed: 26th April 2025]
Contact persons: Bernd Kajtna

Two OHM are notified in Austria: one winter rye OHM ('Berglandroggen') and one spring wheat OHM ('Wildschönauer Sommerweizen'). Both OHM are of the type farmers' selections and they are characterised by their suitability for their particular growing locations. An official list is available at:
https://www.baes.gv.at/fileadmin/baes/Pflanzensorten/%C3%96kologisch_biologisch_heterogenes_Material/2_Oesterreichische_Liste_notifiziertes_OEHM_Stand_23sept2022.pdf
[last accessed 26th April 2025]
A notification procedure is in place in Austria
https://www.baes.gv.at/zulassung/pflanzensorten/oekologisch/biologisch-heterogenes-material
and an official notification form is available at
Antragsformular_OEHM.docx [[both links: last accessed on 26th April 2025]
According to the applicants the notification of the OHM cultivars with the submission of the documents was uncomplicated and worked smoothly. Support by the non-governmental organisation Arche Noah was of great help.
However, there were challenges with regard to marketing PRM of the OHM and the official controls. In fact, the time interval between harvest and sowing is very short, especially in the case of the rye OHM, due to the special location in the Austrian mountains where the material is grown. Therefore, there is very little time for control of the PRM. The official laboratory seed analyses cannot be flexible enough to mana this special situation. Moreover, the costs for the analyses are prohibitively expensive and the requirements for seed purity and also for labelling seem to be too restrictive for this type of niche cultivars.
A proposal for solving these challenges was put forward (by the applicant of the rye OHM V. Müllner): A written declaration could be signed by the farmer confirming that

- seed cleaning has taken place (indicating also the date and type of cleaning
- no diseases were detected during harvesting and/or cleaning and also the
- status of the germination capacity.

For this type of farmer' selections suitable for particular growing conditions and locations this information seems to be adequate for the customers.
In conclusion: Although the notification of OHM was uncomplicated, the actual control system of seed transfers seems to require optimisation and also more time and information so that farmers can familiarise themselves with it.

4.7 Denmark

Organisations providing the information:
Agrolgica (https://www.agrologica.dk/) and Landsorten (https://landsorten.dk/, last accessed for both websites: 26th April 2025)
Contact persons: Anders Borgen (Agrologica) and Johan Siboni Lund (Landsorten)

In Denmark there is a flexible notification system in place based on direct communication with the competent authority. No fees for registration nor administration are charged.
Two OHM of the type 'dynamic population' are notified: 'Mariagertoba' – a spring wheat, notified in 2022 and grown on 350 h in 2023 and Popkorn – a winter wheat, notified in 2022 and grown on 150 ha in 2023. These OHM are marketed within the Landsorten community and there are no seed sales to third parties.
More information on the experience with OHM in Denmark and the Landsorten community was given in a presentation of Dr. Anders Borgen at the 1st LiveSeeding Workshop on OHM on 26th June 2023:
OHM Workshop – Anders Borgen: "Notification and Marketing"

4.8 Hungary

Organization providing the information (within the LiveSeeding project):
The Hungarian Research Institute of Organic Agriculture (ÖMKi)
Contact persons: Szilvia Bencze, Gyöngyi Györéné Kis

1. General information

No.	Question	Short Answer (Yes, No, number of OHM, cost in €)	Comment
1.	Is a **procedure (or any possibility) for OHM notification** established in your country?	No	There was no application request until the end of 2024
2.	Is there an **official form for OHM notification** available?	No	No official form has been developed yet but the old version from the 7-year temporary experiment (from 2021) may be used (it has not been updated)
3.	Which is the **official body responsible for OHM notification** (sensu Art. 13 of 2018/848/EU) in your member state?	NÉBIH	National Food Chain Safety Office (NÉBIH) homepage for variety registration (in Hungarian): https://portal.nebih.gov.hu/-/novenyfajta-kiserletek-fajtaelismeres [last accessed 15th May 2025]
4.	**How many OHM are notified** in your member state? For which crop species?	0	There was a drum wheat population registered within the temporary experiment in 2021.

5.	What are the **costs for the notification** of OHM (i.e. the fees of the official body)?	0 €	Up until now no cost was indicated
6.	Is there the **obligation (or possibility) to deposit a representative PRM sample of the OHM** together with the notification documents?	Yes	For cereals the minimal amount of required seed will be 1 kg
7.	Is there a procedure for **risk-based official controls** of the production and marketing of plant reproductive material (PRM) of OHM in your country? (as foreseen in Art. 9 of the delegated regulation (EU) 2021/1189)	No	It has not been specified for OHM but may be required if there is a risk of high disease pressure
8-	Which is the **competent authority** (or delegated body) **carrying out the risk-based official controls** of the production and marketing of PRM of OHM?	NÉBIH	National Food Chain Safety Office (NÉBIH)
9.	Are there **field inspections for OHM** (carried out in the course of the risk-based official controls of PRM of OHM)?	There may be	
10.	What are the **costs of the risk-based controls** of PRM of OHM (compared to certification costs of standard varieties)?	No data on that	

2. Description of the situation with OHM notification

Hungary joined the 7-year temporary experiment (EU) 2014/150 on cereal populations rather late. The Hungarian Research Institute of Organic Agriculture (ÖMKi) got involved in this experiment together with the National Food Chain Safety Office (NÉBIH), the official body of variety registration in Hungary. During the temporary experiment ÖMKi had one OHM notified, the durum wheat population EPO (in 2021), developed by, and provided by INRAE within the EU-project SolACE. Although in the temporary experiment a registration procedure was initiated in Hungary, since then no more application request has been made for any species. The Agricultural Institute of HUN-REN Centre for Agricultural Research developed a few durum and common wheat OHM. However, they were only tested unofficially and have not been notified.

ÖMKi started its organic breeding programme in 2020 with the aim of developing emmer and durum OHM, and in the long-run, also organic varieties. Possible candidates for OHM notification are under testing – also with the participation of interested farmers – to collect enough data on their performances for the application process. The best materials may be entered in the notification process in 2025.

Unfortunately, in Hungary OHM are still lacking attention, people don't know them and there is no procedure settled. Despite that the official body NÉBIH is open and basically positive on OHM. Sufficient experience has not yet been accumulated on practical issues and how OHM should be handled.

4.9 United Kingdom

Organization providing the information (within the LiveSeeding-project):
Organic Research Centre (ORC)
Contact person: Charlotte Bickler

1. General information

No.	Question	Short Answer (Yes, No, number of OHM, cost in €)	Comment
1.	Is a **procedure (or any possibility) for OHM notification** established in your country?	Yes	
2.	Is there an **official form for OHM notification** available?	Yes	
3.	Which is the **official body responsible for OHM notification**?	APHA	The Animal and Plant Health Agency (DEFRA)
4.	**How many OHM are notified** in the UK? For which crop species?	1	Spring wheat
5.	What are the **costs for the notification** of OHM (i.e. the fees of the official body)?	0	No costs to notify
6.	Is there the **obligation (or possibility) to deposit a seed sample of the OHM** together with the notification documents?	No	
7.	Is there a procedure for **risk-based official controls** of the production and marketing of plant reproductive material (PRM) of OHM in your country?	Yes	After notification, the process is the same as for all seed. See: https://www.gov.uk/guidance/the-marketing-of-agricultural-and-vegetable-seed-varieties [last accessed 26th April 2025]. Perhaps there is some internal adjustment of protocols, but these have not been outlined. I think it is being determined on a case-by-case basis and, seen as we have not registered many OHM, they are not prioritising adapting these processes/protocols more broadly.
8.	Which is the **competent authority** (or delegated body) **carrying out the risk-based official controls** of the production and marketing of PRM of OHM?	NIAB	https://www.niab.com/services/seed-certification [last accessed 26th April 2025]

9.	Are there **field inspections for OHM** (carried out in the course of the risk-based official controls of PRM of OHM)?	Yes	
10.	What are the **costs of the risk-based controls** of PRM of OHM (compared to certification costs of standard varieties)?	Same	Seed certification costs vary depending on the crop type, application method (online or by post), and whether the inspection is official or licensed. They are outlined here: https://www.gov.uk/guidance/the-marketing-of-agricultural-and-vegetable-seed-varieties [last accessed 26th April 2025]

2. Description of the situation with OHM notification

National authorities in the UK were very engaged in the temporary experiment (EU) 2014/150 on cereal populations, both nationally and at an EU level. However, the UK left the EU and did not adopt the EU organic regulation 2018/848. Instead, they worked with stakeholders to design a Statutory Instrument which would create (another) Temporary Experiment: The Seed Marketing (Heterogeneous Material) (Temporary Experiment) (England) Regulations 2023, see https://www.legislation.gov.uk/uksi/2023/676/made [last accessed 26th April 2025]. This outlines the notification (registration) process for heterogeneous material in England. Scotland and Wales are developing their own legislation as this is a devolved responsibility, but nothing has been finalised at time of writing (March 2025). A copy of the template is available here.

So far UK Grain Lab have only registered one spring wheat OHM, and are not aware of any other organisations registering any. The process was very straightforward but felt somewhat performative. The challenges arise when it comes to complying with standardised controls for seed after notification/registration. It is a delicate situation as resources and capacity for work on (O)HM is very low and actors do not feel that there is value in engaging with the national authorities particularly when they do not adapt their systems for (O)HM. At the same time, the authorities observe that demand is low and therefore do not adapt their systems.

4.10 Growing area of OHM in Europe

At the moment only rough and incomplete estimates are available for the dissemination of OHM in Europe. The data collected within the LiveSeeding project suggests that **OHM was grown on a total surface area of more than 1,000 hectares** (ha) **in Europe in the vegetation period 2023/24**. Maize, rye and wheat OHM contributed each with more than 400 ha, 150 ha and 600 ha to this total area (see Figure 3).

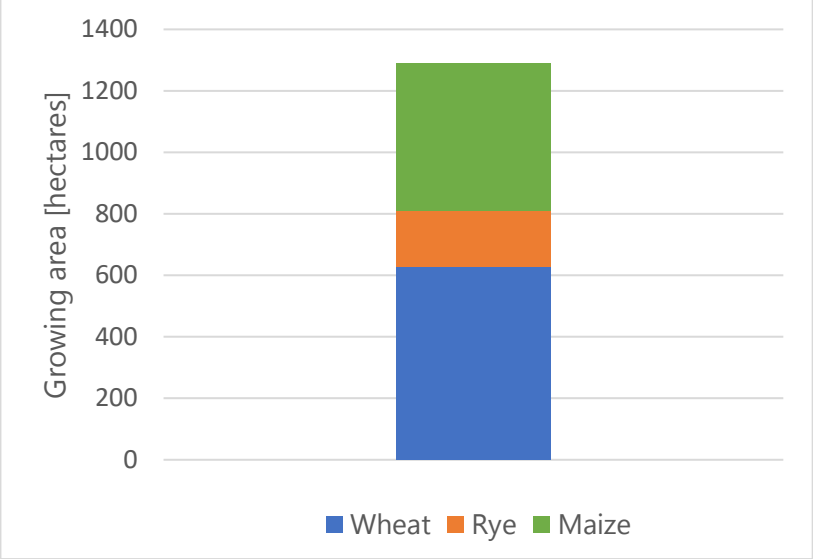

Figure 3: Total growing area of OHM in Europe in the vegetation period 2023/24

Note that the data to create Figure 3 was obtained from only two operators, the membership organisation Landsorten[10] in Denmark and the seed marketing company BioSaat GmbH[11] in Germany, both specialists in marketing organic seeds. In total they placed seed of eight OHM on the market: three maize, one rye, three winter wheat and one spring wheat cultivar (the contribution of Landsorten was one winter and one spring wheat OHM each). **These OHM were grown in seven European countries in the season 2023/24** (see Figure 4).

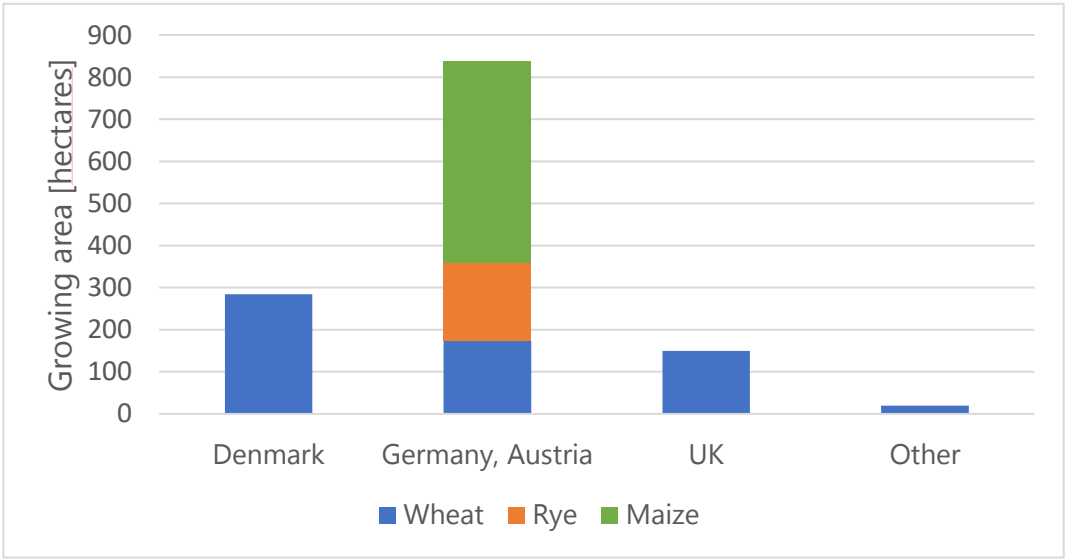

Figure 4: Growing area of OHM in Europe by country and crop species in the vegetation period 2023/24. UK: United Kingdom. Other countries: include Belgium, Ireland and the Netherlands.

[10] https://landsorten.dk/ [last accessed 29th April 2025]

[11] https://biosaat.eu/ [last accessed 29th April 2025]

The numbers in Figures 3 and 4 are conservative estimates of the area of OHM being cultivated across Europe. In particular, in the case of the cultivars marketed by BioSaat GmbH, it was not possible to include the growing area from farm saved seed.

There were attempts made in the LiveSeeding project to collect data from other European countries. The numbers obtained from Austria and France, however, were quite low (well below 100 hectares in the season 2023/24). Project partners report that the quantities and growing areas from Italy will represent relevant contributions but until spring 2025 there was no official notification procedure in place in this country. Likewise in the UK, there is likely to be a greater area under cultivation than any reported figures.

The dissemination of OHM will continue to grow in the coming years. It will be important to collect and process this data. Especially in the case of vegetable OHM and OHM for niche markets, it will also be appropriate to introduce other indicators than growing area, e.g. the number of packages sold or information on quantities of final products to determine the broader value of OHM. The aim of the data collection should be to represent the promising future perspectives of OHM in Europe accurately.

5. Conclusion and recommendations

Organic Heterogeneous Material has **strong potential to increase the resilience and genetic diversity of organic farming systems**, particularly by mitigating effects of climate change. In the years ahead, it will be essential to further investigate and assess the wide variety of OHM types and crop species under real farming conditions.

As of April 2025, when this deliverable was finalised, eight EU Member States had implemented the OHM notification procedure. A total of **49 OHM cultivars had been notified, covering seven agricultural and nine vegetable species**, including faba bean, maize, rice, rye, sunflower, bread wheat, durum and Khorasan wheat, aubergine, tomato, and zucchini.

The **notification procedure is generally recognised as an efficient system for regulating the market access of OHM** by different stakeholders. In particular, the application forms provided by competent authorities in at least five Member States are seen as valuable tools for applicants. These forms allow for the structured submission of information required in the descriptive dossier, which includes phenotypic characterisation, agronomic traits, breeding techniques and details on parental material, among other elements. The templates used across the different countries are largely consistent.

Within the LiveSeeding project, **concrete recommendations have been developed to strengthen the implementation of the OHM regulatory framework**. These proposals target OHM breeders and seed producers, authorities responsible for notification and plant reproductive material (PRM) control as well as European and national policy makers. The following sections present these recommendations in order: first, those related to the notification procedure, followed by suggestions on official PRM controls, and finally, broader policy considerations.

A. Notification procedure

A.1 A detailed and accurate description of cultivars is essential for the effective regulation and marketing of Organic Heterogeneous Material (OHM). Such descriptions are not only relevant to customers but also support traceability, strengthen official plant reproductive material (PRM) control systems, and help safeguard the integrity of OHM as an organic product.

Section 2.3 of this deliverable provides guidance to help applicants prepare clear and comprehensive cultivar descriptions. It is the responsibility of competent authorities to carry out a critical review of the submitted descriptive dossiers.

It is important to underline that, beyond phenotypic characterisation, the documentation of parental material, breeding methods and the breeding process itself is of particular significance. These elements are crucial in capturing the

distinct characteristics of OHM, especially its dynamic capacity to evolve and adapt over time and in response to specific environments.

A.2 The description included in the notification dossier should be made publicly accessible by the competent authority, for example by publishing it on an official website. Applicants must be informed in advance about this intended disclosure, for instance through a note included in the notification form. **This open-access approach**, already implemented in France, **ensures that the description of OHM** (see point A.1 above) is **available to customers across the value chain** and can be effectively consulted by control bodies. Such transparency is fully in line with the values and expectations of the organic sector, which strongly advocates for a high level of openness and traceability.

A.3 Results on agronomic and quality traits are an essential element of the OHM cultivar description, supporting informed decision-making by customers. **To strengthen this dimension, opportunities to conduct field trials for assessing these traits should be further developed**. Depending on the context, this may include the inclusion of OHM cultivars in regional post-registration trials, the implementation of adapted and low-cost testing schemes (as they are developed within the LiveSeeding project, see deliverable D2.5 with due date in April 2026) or the use of targeted testing methods to assess resistances to certain diseases, other biotic or abiotic stress or the suitability to low-input systems.

A.4 It should be clarified that the competent authorities have the authority to request additional information or corrections to the dossier, or to terminate the notification even after the OHM has been officially listed. This may be necessary, for instance, if errors or inconsistences in the submitted dossier are identified or (PRM of) the OHM no longer meets requirements of the Organic and Delegated Regulations (EU) 2018/848 and 2021/1189.

A.5 Finally, experience in France has shown that **a committee of recognised experts reviewing OHM notification dossiers** can significantly enhance the quality of the notification process. Establishing such a committee may be particularly relevant for Member States that have not yet implemented notification systems and may need to draw on external expertise, including from third parties or other countries.

B. Official risk-based, post marketing controls of Plant Reproductive Material (PRM) of OHM

B.1 Experience from several Member States suggests that **the PRM certification authorities should be designated as the main responsible body for the official controls of PRM of OHM**. It is these authorities that are equipped with

the necessary expertise to monitor and test PRM and, if appropriate, to conduct field inspections. Still, some tasks, such as checking the documents according to Article 8 of the Delegated Regulation (EU) 2021/1189 ensuring the traceability of OHM, can be also delegated to the organic control authorities. In any case it is important that the responsibilities between the two bodies are clearly assigned in each Member State.

B.2 The costs of the risk-based, post-marketing controls of OHM should not be higher than the certification costs of standard varieties ensuring a level playing field for the different cultivar types. Efficient official control systems should be implemented.

B.3 The competent authority should strictly monitor the requirements for labelling and packaging PRM of OHM. According to the Delegated Regulation (EU) 2021/1189 the PRM shall be marketed using the phrase "organic heterogeneous material" as well as a yellow label with a green diagonal cross on it. In addition, the PRM shall be clearly marked as organically certified PRM.

In particular, **the authority should assert that the exemption for small package sizes** of Article 7 (5) of the Delegated Regulation **is not misused to place different or even misleading information on the PRM containers** (see also the point C.2 below). Finally, it should be also checked that the information disseminated with the promotion of the OHM, e.g. in online advertising, is consistent with the description in the notification dossier (see also point A.2).

B.4 The OHMTrack software platform, developed within the LiveSeeding project, supports both operators and official bodies in managing the notification of OHM cultivars and ensuring traceability of PRM of OHM. Features enabling interoperability with other software tools, platforms and data formats are currently being integrated. **We recommend that competent authorities officially adopt OHMTrack as a standard open-source tool, or alternatively establish national systems that are fully compatible.** At the very least, the use of OHMTrack should be actively encouraged in contexts where no other suitable alternatives are available**.**

C. Policy framework

C.1 Value chains for OHM have been established with maize, rye and wheat cultivars growing already on more than 1,000 hectares in Denmark, Germany, Italy and Austria in the vegetation period 2023/24. Organic breeders, seed producers, farmers, traders and processor depend on these markets for their income and there is considerable potential for future market growth. Therefore, within the context of the proposal for the new European PRM marketing regulation from 5th July 2023**, the legal framework for OHM with its essential**

elements should remain unchanged in order to protect these business opportunities. It is certainly welcome that the benefits of heterogeneous material may also be extended to conventional agriculture. However, this should not come at the expense of the organic sector or create disadvantages for its stakeholders.

C.2 As explained above, the consequences of the exemption for the marketing of PRM of OHM in small package sizes should not be that the customers are misled or not properly informed about what the packages contain. **Therefore, it is proposed that in Article 7 (5) of the Delegated Regulation (EU) 2021/1189 the word "unmarked" should be deleted:**

"By way of derogation [...] seed of OHM contained in closed and labelled packages and containers may be sold to final users in ~~***unmarked and***~~ *unsealed packages up to the maximum quantities provided for in Annex II, provided that, on request, the purchaser is informed in writing at the time of delivery about the species, the denomination of the material and the reference number of the lot."*

It should also be stated explicitly in the Delegated Regulation that when PRM of OHM is marketed it shall be indicated that the PRM is organically certified on the packages or at least on the delivery note and when promoting the OHM.

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Annex 1: List of notified OHM

Table 5: List of notified OHM in the EU (not complete). Source: https://www.geves.fr/variety-seed-expertise/organic-agriculture/organic-heterogeneous-material/ [last accessed 29th April 2025]

Member State	Species	Denomination	Operator	Date of registration
Austria	*Secale cereale L.* (winter type)	Berglandroggen	Veronika Müllner, Kaltenbach 25, 3632 Bad Traunstein	02.06.2022
Austria	*Triticum aestivum* (spring type)	Wildschönauer Sommerweizen	Emil Platzer, Gainfeld 14, 5500 Bischofshofen	08.06.2022
Czech Republic	*Capsicum annuum*	Měňavka	Marek Kvapil, Pňovice 55, CZE – 784 01	03.03.2022
Czech Republic	*Cucurbita pepo*	Lofthousova zimní tykev	Marek Kvapil, Pňovice 55, CZE – 784 01	07.02.2023
Czech Republic	*Lactuca sativa*	Listonoh	Marek Kvapil, Pňovice 55, CZE – 784 01	06.01.2023
Czech Republic	*Phaseolus vulgaris*	Lofthouse Landrace Beans	Marek Kvapil, Pňovice 55, CZE – 784 01	03.03.2022
Czech Republic	*Solanum lycopersicum*	Vejce ptáka Ohniváka	Marek Kvapil, Pňovice 55, CZE – 784 01	03.03.2022
Czech Republic	*Solanum lycopersicum*	Valouny	Marek Kvapil, Pňovice 55, CZE – 784 01	03.03.2022
Czech Republic	*Solanum melongena*	Kvapík	Marek Kvapil, Pňovice 55, CZE – 784 01	03.03.2022
Czech Republic	*Zea mays*	Malované hory	Marek Kvapil, Pňovice 55, CZE – 784 01	06.01.2023
Denmark	*Triticum aestivum* (spring type)	Mariagertoba	Landsorten, Houvej 55, DK-9550 Mariager	30.06.2022

Denmark	*Triticum aestivum* (winter type)	Popkorn	Landsorten, Houvej 55, DK-9550 Mariager	30.06.2022
France	*Triticum aestivum* (winter type)	Pop Orvilliers	Ferme d'Orvilliers	25.01.2024
Germany	*Secale cereale L.*	Baldachin	Landbauschule Dottenfelderhof e.V., Dottenfelderhof 1, 61118 Bad Vilbel	12.05.2022
Germany	*Secale cereale L.*	Dodo	Werner Vogt-Kaute, Steingrund 27, 97797 Wartmannsroth	11.04.2022
Germany	*Secale cereale L.*	Perfirmalina	Herr Malte Kraus, Hofäckerweg 3, 71579 Spiegelberg	08.05.2024
Germany	*Triticum aestivum (spring type)*	Convento C	Landbauschule Dottenfelderhof e.V., Dottenfelderhof 1, 61118 Bad Vilbel	02.02.2022
Germany	*Triticum aestivum (spring type)*	Convento E	Landbauschule Dottenfelderhof e.V., Dottenfelderhof 1, 61118 Bad Vilbel	02.02.2022
Germany	*Triticum aestivum (winter type)*	Brandex	Landbauschule Dottenfelderhof e.V., Dottenfelderhof 1, 61118 Bad Vilbel	02.02.2022
Germany	*Triticum aestivum (winter type)*	Liocharls	Landbauschule Dottenfelderhof e.V., Dottenfelderhof 1, 61118 Bad Vilbel	02.02.2022
Germany	*Vicia faba L. (Partim)*	Detta	Werner Vogt-Kaute, Steingrund 27, 97797 Wartmannsroth	11.04.2022
Germany	*Zea mays*	Evolino	Firma Getreidezüchtung Peter Kunz Deutschland, gemeinnützige GmbH, Gut Mönchhof 2, 37290 Meißner	01.06.2022
Germany	*Zea mays*	Almito	Landbauschule Dottenfelderhof e.V., Dottenfelderhof 1, 61118 Bad Vilbel	02.02.2022

Germany	*Zea mays*	Bogdan	Landbauschule Dottenfelderhof e.V., Dottenfelderhof 1, 61118 Bad Vilbel	02.02.2022
Germany	*Zea mays*	Tambudzai	Landesanstalt für Landwirtschaft Institut für Pflanzenbau und Pflanzenzüchtung, Am Gereuth 8, 85354 Freising	10.02.2022
Germany	*Zea mays*	Weihsteph 2	Landesanstalt für Landwirtschaft Institut für Pflanzenbau und Pflanzenzüchtung, Am Gereuth 8, 85354 Freising	10.02.2022
Germany	*Zea mays*	Weihsteph 3	Landesanstalt für Landwirtschaft Institut für Pflanzenbau und Pflanzenzüchtung, Am Gereuth 8, 85354 Freising	10.02.2022
Poland	*Zea mays*	Hańcza	"Pietrzak" sp. z o.o. sp. k.	05.12.2023
Poland	*Zea mays*	Ukiel	"Pietrzak" sp. z o.o. sp. k.	27.11.2024
Poland	*Zea mays*	Isąg	"Pietrzak" sp. z o.o. sp. k.	27.11.2024
Poland	*Zea mays*	Notyst	"Pietrzak" sp. z o.o. sp. k.	27.11.2024
Poland	*Raphanus sativus subsp. niger var. niger* J.Kern	Axona	GLOBALGRASS sp. z o.o.	08.04.2025
Slovenia	*Beta vulgaris L.* - Spinach beet or Chard	Tanja	Ekološka kmetija Ipavec, Mitja Ipavec, Šmarje 68, 5295 Branik	30.11.2022
Slovenia	*Phaseolus coccineus L.*	Šurk	EKOSEMENA, Rožna Dolina 50 A, 4248 Lesce, Urška Šranc, Belska cesta 36, 4281 Mojstrana	02.12.2023
Slovenia	*Phaseolus vulgaris L.*	KIS Bogo	Kmetijski inštitut Slovenije, Infrastrukturni Center Jablje, Grajska cesta 1, 1234 Mengeš	22.12.2023
Slovenia	*Phaseolus vulgaris L.*	KIS Deodat	Kmetijski inštitut Slovenije, Infrastrukturni Center Jablje, Grajska cesta 1, 1234 Mengeš	22.12.2023

Annex 2: Table on the comparison of notification forms from France, Germany, Italy and the UK

Table 6: Comparison of notification forms from France, Germany, Italy and the United Kingdom (UK) (adapted from Guidotti & Marchi 2025). Cells highlighted in orange indicate fields that are not required in that country. The numbers (No.) refer to the numbering in the German notification form (see Table 3 in section 2.4).

No.	Entry	France	Germany	Italy	UK
1	**Name of the notifier**	Name of the applicant	Notifying person or company	Name of the applicants with fiscal identification code, farm registration code and organic registration code	Name and address of applicant (where the applicant is not an individual, the person responsible for participation in the experiment)
	Address	Address	Address	Address	Address
	Phone	Telephone	Long distance call		Telephone
	Email	Email	Email		Email
1-B	**Name of the maintainer**			Name of the applicants with fiscal identification code, farm registration code and organic registration code	
				Address	
2	**Contact for communication**		Address		
3	**Species**	Species	Species	Species (botanical and common)	Species and varieties used to create population
4	**Denomination**	Proposed name	Denomination of the OHM	Denomination of the OHM	Name of the population (or proposed name)

5	**Trade mark registration**		The indicated denomination has been registered as a trade mark		
6	**Parental material**	Parental description	Description of the parent material, if applicable, indicate the varieties or genotypes used to create the OHM	Parental description	Species and varieties used to create population
7	**Type of breeding technique**		Type of breeding technique		
8	**Description of the breeding technique**	Description of the method	Description of the breeding technique, the crossing and production protocols (for a CCP) or the on-farm management and selection practices	Adopted methods	Objectives of the breeding programme Description of the type of technique used to generate the population, including the breeding scheme
9	**Phenotypic characterization**	Phenotypic characterization, common traits (and level of heterogeneity)	Phenotypic characterization of essential features common to the materiel	Phenotypic characterization	Description of the population's characteristics, including - whether it is self-pollinating; disease resistance; taste or colour; and any other characteristic which the applicant regards as relevant. Results of any experimental trials concerning the

					characteristics specified.
	Heterogeneity	Level of 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
	Agronomic value	Agronomic and use 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, use value	Yield, yield stability and quality; performance
10	**Country/ locations**	Site	Country of breeding or production, indication of region, if applicable	Location where the OHM has been bred	Region or proposed region of production
11	**Pedo-climatic conditions**	Description of soil and climatic conditions	Description of soil and climatic conditions	Description of soil and climatic conditions	
12	**Year of production**		Indication of the year of production		
	Maintainer (if different)			Name of the operators that maintain the OHM	Name and address of the person responsible for the breeding, production

					and maintenance
	Suitability for organic or low input growing conditions	Favourable conditions for cultivation and use (not mandatory)			Usability in low-input agriculture