RESOLUTION OIV-VITI 565-2022

OIV GUIDELINES FOR THE HARMONIZATION OF REQUIREMENTS FOR EXCHANGE OF VITICULTURAL PLANT MATERIAL: PHYTOSANITARY AND GENETIC ASPECTS

THE GENERAL ASSEMBLY,

ON THE PROPOSAL of Commission I “Viticulture”,

IN VIEW OF Article 2, paragraph 2 b) i and c) iii of the Agreement of 3 April 2001 establishing the International Organisation of Vine and Wine, and under points 2.b.ii and 2.d.iii of the OIV Strategic Plan 2015-2019, which foresaw the definition of different categories of grapevine products, including that regarding the grapevine germplasm material, and to harmonize the diagnosis and the identification of grapevine diseases and pathogens with technical methods, as well as the point 3.b.ii which relates to plant material exchanges, and promotes the identification and the sanitary and phytosanitary control tools,

CONSIDERING the many works presented during the meetings of the expert groups, particularly the "Genetic Resources and Vine Selection" (GENET) and "Vine Protection" (PROTEC) Expert Groups, and following a proposal made by both Groups,

CONSIDERING Resolution OIV/VITI 424/2010, “Conservation of Vine’s Genetic Resources”, concerning the conservation of grapevine genetic resources, and especially the part that refers to facilitating its implementation in order to catalogue plant material, promote its conservation and actively support research in the interest of improving the different conservation systems,

CONSIDERING Resolution VITI 01/2002, “Conservation of Diversity”, concerning the maintenance of the widest possible genetic diversity, the technological value of this diversity and the encouragement of the development of local varieties,

CONSIDERING Resolution OIV-VITI 539-2017, “OIV guidelines for recognising grapevine collections”, concerning the establishment the requirements that an ampelographic collection must have to be included in the specific list of the OIV,

CONSIDERING Resolution OIV-VITI 609-2019, “OIV protocol for identification of varieties”, concerning the procedures to be followed to identify vine varieties and to harmonize these criteria,

CONSIDERING the demands expressed by the grapevine’s propagators related to the definition of harmonized criteria for enhancing the exchanges of grapevine

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propagation material at an international level,

CONSIDERING the existence of laws that are currently applicable at an international level, in addition the availability of various diagnostic methods for genetic and phytosanitary identification, and the need for standardised criteria for safe exchange of plant material among different countries,

DECIDES to adopt the following OIV guidelines for the harmonization of methods and criteria for the exchange of viticultural plant material: phytosanitary and genetic aspects

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ANNEXES

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1. Introduction

The OIV Member States have their own regulations in place through National Plant Protection Organisations (NPPOs)[1], or have established the necessary agreements among themselves that apply to the production, introduction, and safe exchange of grapevine propagation material. However, considering there may be discrepancies between producing and importing countries, the OIV considers it important to harmonise said regulations and agreements, and establish standards with a global reach to be used by all Member States.

2. Objectives

The main objective of this resolution is to define principles and practices that make it possible to guarantee and preserve the genetic quality and phytosanitary initial level of plants during all phases of vegetative propagation. In addition, these indications furnished by the OIV can help the international agreements between producers and importers of grapevine plant material.

OIV guidelines shall consider and recommend minimum requirements for the vegetal material exchange, for each type of grapevine variety (rootstocks and/or wine table and raisin grape varieties from the subgenus *Vitis*, ex *Euvitis*).

The plant propagation material can be exchanged if it has been successfully submitted to the control and/or certification procedures, if the case, envisaged by the relevant legislation of each State have been successfully performed.

The principles and practices defined in this document may not concern the exchange of propagating material of grapevine varieties for experimental or demonstrative aims.

3. Glossary

For the purposes of globally standardising the terms used for the processes of exchange, production and commercialisation of viticultural plant material, the following glossary is proposed[2]:

- Propagation (vegetative) material: grapevine plants, cuttings, scions, and canes

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taken from the mother plants.

- Mother plant: a grapevine plant grown destined for the production of scions, cuttings and canes intended for vegetative propagation.
- Mother grapevine block: cultivation, in an identifiable location, of vine mother plants destined for the production of cuttings, grafts and vine shoots.
- Foundation block: planting of grapevines propagated and maintained that are intended as a source of foundation material.
- Varietal Collection: collection of varieties or clones that meets the criteria indicated by Resolution OIV-VITI 539-2017
- Grapevine plant
    - Rooted cuttings: young plant or ungrafted shoots of rooted grapevine obtained from lignified shoots, canes or herbaceous shoots, intended for planting ungrafted or for use as rootstock, whose lower part is rooted.
    - Rooted grafts (grafted plant): young plant obtained from grapevine lignified shoot, cane or herbaceous shoot, and joined by grafting with rootstock cuttings, whose lower part is rooted.
    - Potted plant: young plant rooted or grafted in vegetative or dormant phase raised and preserved in pot structure.
- Vine plant parts:
    - Cane: one-year-old and lignified branches.
    - Herbaceous Shoot: fraction of herbaceous not lignified shoots of the grapevine with vegetative tip, leaves, lateral shoots, buds and inflorescence sketches.
    - Nursery cuttings: pieces of grapevine lignified shoot, sprouts, cane or herbaceous shoot intended for the production of rooted cuttings
    - Rootstock cutting: piece of cane / shoot of rootstocks intended to form roots system of cuttings after grafting.
    - Scion: piece of cane / shoot with at least one bud intended to form the epigeal part of the grafted vine or to form rooted cuttings to be planted in the field.

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- Nursery: site destined for the production of grapevine plant.
- Lot: a set of grafts, cuttings, plants frank or grafted of the same variety and/or a same varietal clone of grafts and/or rootstock, from the same field of mother plants or from the same nursery, produced in the same vintage
- Certification: a public procedure established by a recognised body, based on specific national or international standards which establish authorisations and certifications of genetic and phytosanitary conformity of the propagation material.
- Certified material: reproductive material from mother plant or nurseries that meets the certification requirements and subjected to favourable genetic and phytosanitary control.
- Categories of propagation material: initial, base, certified, standardised or equivalent categories according to national regulations.
- Productive use of grapevine plants: vine varieties for the use of rootstock, wine grapes, table grapes, dried grapes, nectar, grape-juice, canned and frozen fruits, biomass.
- Accession: isolated or selected genotype of one variety of a selected clone or germplasm mother plant still grown in ampelographic collections or under study and evaluation.
- Selected clone: A clone is the vegetative progeny of a single vine plant. For selection purpose this single plant is chosen for its varietal identity, its phenotypic traits and its phytosanitary state (OIV-VITI 564A-2017).
- Polyclonal selection: the selection of a group of 7 to 20 genotypes from an experimental field trial containing a representative sample of the intra-varietal variability of ancient variety using quantitative genetic tools to enable high, stable, and predictable genetic gains. (OIV-VITI 564B-2019)

4. Crop monitoring

Regular monitoring and inspections of mother blocks and nurseries are necessary in order to detect any possible varietal impurities harmful to vine propagation to be found and also, for diseases of mother plants, nurseries and ampelographic collections as recommended by resolutions OIV-VITI 424-2010 and OIV-VITI 539-2017.

The visual inspections must be done during a period favourable to the expression of

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the vine phenotypic features and symptoms of the diseases being monitored. It must be conducted by qualified personnel.

For correct monitoring a mother-plant vineyard and each plot in a collection must be identified by at least one sign post indicating their variety and clone or an identity code.

5. Varietal authenticity: verification of the identity of varieties

The OIV recommends using the adopted and updated (by the OIV) varietal identification protocols: molecular analyses, DNA tests (SNPs or SSRs), and ampelographic exams according to the resolution OIV-VITI 609-2019 and to the OIV descriptors list for grape varieties and *vitis* species and its updates, which could be used in order to evaluate the authenticity of each plot or plant batch with respect to its variety.

Other standardised methods of validation and evaluation for trade purposes can be established between the interested parties, prior to their use within the framework of protocols for variety identification.

Identification and denomination of a variety should be in accordance with a common list of existing varieties (names and synonyms) and a database containing descriptive characters both morphological and molecular). The application and its acceptance as an international reference are highly recommended.

In addition, the OIV recommends mentioning the use of the following international lists of vine varieties and their synonyms:

- The OIV International list of vine varieties and their synonyms,
- The UPOV[3] PLUTO database.

6. Phytosanitary criteria

It is up to the importing Countries of plant material of the grapevine to fix phytosanitary prophylaxis measures prior the introduction of the material in its own territory and exercise phytosanitary control to avoid the introduction of harmful organisms in their country. The OIV recommend that phytosanitary control should be subject to consultation between accordance between producer and importer, in accordance with the regulations in force.

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6.1. Basic measures

The exchange plant materials must be free of quarantine organisms (harmful) established by the States involved in the exchange.

Each State, in relation to the phytosanitary situation of its own territory and with reference to the international agreements, would adopt and take the necessary measures to protect their own territory from harmful organisms, indicated in tables 1a and 2 of annex A in the case exchange of propagation material.

Material coming from countries that adopt process or product certification procedures for vine propagating material, which foresee the control of the harmful organisms listed in table 1a and 2 of annex A, can be exchanged without further analytical investigations.

In other case the exchange may take place following the performance of the analyses foreseen in table 1a and 2 of annex A on a representative sample of the lot and according to the methods defined by the countries concerned in accordance with the provisions of point 6.4.2 below.

Derogations on the phytosanitary status of plant material exchanged for non-commercial reasons from that provided for in Table 1 may be established in advance by the States involved in such exchange.

6.2. Quarantine disease and pest lists

In order to facilitate the exchange of vine plant material, the OIV has decided to publish and update a general list of links relating to regulated and unregulated grapevine pests on its website (see tables 1a and 2 of annex A).

For the control of quarantine organisms, the official methodologies regulated by each state should be adopting, where applicable, analytical standards recommended by EPPO.

6.3. Appropriate protection in field

- Good protection practices should be observed in collections and mother blocks according to OIV and National regulation, to make sure that there is a high physiological quality of cuttings. The same level of protection must be applied in nursery fields.

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6.4. Phytosanitary prophylaxis methods

6.4.1. Principles

Fields in which the plant material for propagation is grown must ensure the appropriate, effective guarantees of the absence of the pathogen agents and the vectors of viruses, bacteria and phytoplasma that could reduce the quality of the propagation material.

On the designated vineyards of mother plants chosen for the production of plant material propagation in nurseries, mother plants must be regularly monitored for the presence of primarily viruses, phytoplasma and bacteria, or any other infection-causing agent considered dangerous.

It is recommended that the mother plants should be free of the main grapevine trunk diseases (GTD) such as esca disease, eutipiosis and Botryosphaeria decay.

Foundation blocks must be protected from pathogen vectors (nematodes, mites, leafhoppers, scales etc.),

To achieve acceptable levels of phytosanitary standards, it is envisaged that the following measures shall be applied: visual phytosanitary control to monitor the appearance of transmissible pathogens and, where appropriate, sampling and laboratory tests of vegetable material for checking the phytosanitary status. Phytosanitary interventions (e.g. chemical and mechanical treatment) may be required to avoid and control the appearance of vectors of viruses, phytoplasmas and bacterium *Xylella fastidiosa*.

6.4.2. Sampling of plant material for phytosanitary analyses of international exchange batches

In absence of normative and international treaties (subscribed by the Member States), specific agreements between the countries are settled to establish control methods, pathogenic organisms to be excluded, the entity of the sample, the type of tissue and the period of the year in which the test is conducted and admissible health and tolerance levels expressed in percentages of the lot.

The sample number depends on the batch size, the required confidence level and the particular level of detection. Appropriate sample sizes are provided by FAO/IPPC Intern. Standard for phytosanitary measures No. 31.

Batches must be clearly identified in terms of lot in accordance with the provisions of the glossary.

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6.4.3. Methods of analysis of harmful organisms affecting the quality of the propagating material

For virus analysis, the OIV recommends that phytosanitary control should be carried out to ensure the absence of these organisms, in accordance with the methods described in the table 1a of Annex. And additionally, in accordance with the agreements established between the parties for dangerous organisms recognized by the international scientific community. Only lots that have been subjected to analysis according to the indications shown in tables 1a of the Annex A or in Annex III of resolution OIV-VITI 564A / 2017 give the best levels of phytosanitary guarantee in terms of viral agents.

In the case of propagation material produced according to certification protocols, reference must be done to the legislation in force at the moment in the country of origin as for the exemption of viruses and viral diseases.

In case of exchange of propagation material coming from collections, it is necessary to declare its sanitary status.

For the analysis of diseases caused by phytoplasma (table 2 of annex A), molecular techniques (PCR, real-time PCR) with extraction of DNA from herbaceous tissues and cane material (leaves, petioles, etc.) are recommended.

For the analysis of diseases caused by bacteria, molecular techniques are recommended. The FAO/IPPC diagnostic protocol (FAO/IPPC International Standard for Phytosanitary Measures No. 27) provides the appropriate sample sizes and molecular techniques such as for the case of *Xylella fastidiosa* (Pierce's disease causal agent).

6.4.4. Prophylaxis on exchange material

To promote better phytosanitary prophylaxis against phytoplasmas, bacteria, nematodes, and phylloxera diseases (EPPO, ANSES) and fungi associated with the main wood diseases is recommended interventions with hot water treatments and external disinfection of the propagation material. These interventions may be mandatory in accordance with the only legislation in force and provided by each Member State.

6.4.4.1. Hot water treatment (HWT)

Hot water treatments (applied to woody plant propagation material) are considered preventative measures of phytosanitary prevention to avoid the spread of phytoplasmas and bacteria (to a lesser degree).

In addition, the OIV recommends respecting the national legislation, exemptions and regulations in force in the countries of origin and destination and reviewing these

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before applying any treatment. Considering the possible risks on the ability of vegetative growth of this plant material, treated with hot water and destined for long distances (export and import), they must have decided the treatments' conditions, to be carried out preferably in the country of arrival.

Several differences were found among the national schemes and standards in force (Table 3 in Annex A). These differences depend on both the purpose of the treatment and the type of plant material that needs to be treated.

In any case, the hot water treatment of vine propagation material is not an absolute guarantee of a good phytosanitary state or of disinfection for all types of pathogens or pests.

Its application requires particular measures to be taken in order to avoid damage to cells, to tissues and to reduce risks with regard to the growth capacity of the plant material.

To avoid the appearance of potential problems related to the plant material propagation, the OIV proposes the following guidelines regarding the use of hot water treatments for the specific pathogens. The following criteria are decisive for success on the pathogen or vector treatments and also, the survival of plant material:

- High physiological quality standard and good dormancy status of the material to be treated.
- Storage of the plant material to be treated under optimal conditions
- Hot Water Treatment should be applied during the dormancy phase of graft wood or plants.
- Temperature and time: Appropriate combination of treatment time and temperature for the specific pathogen. The evaluation of specific protocols is necessary, in accordance with Table 3 of Annex A.
- Vegetal Material cleaning: phytosanitary products residue, presence of (paraffin) waxes, soil residue or peat on the roots should be avoided for plants with roots.
- HWT Method: complete immersion of packaged plant material treated in batches in tanks to assure rapid attainment of homogeneous temperature in the whole tank.
- Storage post treatment: progressive acclimatisation to avoid thermal shock, in a humid and well-ventilated atmosphere.
- Checking: analysis of the vegetative growth of the heat-treated material.

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7. Storage and conservation of plant material

Before and during exchange of propagation material (scions, rootstocks, cuttings, rooted plants and grafts, potted plants...), all plant material must be stored in optimal conditions to ensure its subsequent vegetative growth.

The propagation material:

- Should have a visual technical purity of 100%. Absence of wounds (E.g.: hail, insects, other), necrosis, symptoms of external fungi (E.g.: mildew, dead arm, other).
- Should be protected against physical and physiological damage.
- Should be kept separate from unidentified propagation material and from material of other lots.

7.1. Environmental conditions of buildings

After harvesting and during the processing, preparation and disposal, storage and transport phases the material is conserved in optimal (standard) conditions to ensure its long-term viability and use possibility. To this end, it is proposed to conserve them in a cold storage from 2-5 °C, and relative humidity around 85%.

In case of transport over a long distance, exchange material must be preserved under temperature and moisture conditions suitable to the final destination.

The vegetative material used for nursery production should be harvested during the same campaign (harvest) that the mother plants in question, with the object of avoiding the use of cuttings, scions and canes having stayed a year or more in a cold storage. Plant material from these plots must be clearly identified, in terms of lot.

7.2. Packaging

Cardboards, boxes, bags of propagation material must be sealed in such a manner that they cannot be opened without damaging the seal, if any.

Each container, box or batch of propagation material should carry a label that can be clearly visible and easily accessed.

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8. Labelling and management of plant material

The guarantee of traceability should be based on the documentation and compliance with existing or future protocols.

Possible additional measures can be adopted, as required by the recipient of the materials of propagation.

There are protocols linked to other quality labels (such as ISO 9001 or ISO 17025) or certified through an external or auditing company (e.g. SGS and the New Zealand system), while other protocols refer to national or international regulations with regard to traceability or recommendations for use.

8.1. Labelling standards

Letters and figures used to indicate the relevant characteristics of the material on such labels should:

- be of a font that is easy to read, or, as in the case of international trade, in a language commonly known to the countries concerned, also using the national code of origin country or another international code recognized among the parts,
- be of a colour that is in clear contrast with the colour of the labels on which they appear,
- be indelibly printed and clearly legible.

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ANNEXES

ANNEX A: Phytosanitary Requirements and Recommendations

Table 1. The main grapevine viral diseases with the associated viruses and the diagnostic methods for their control in viticultural propagation material for the purposes of international exchange.

This table has been established taking into account that:

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i. Exchange of grapevine propagation material infected by harmful organisms is the primary means of dissemination of viral agents and the associated graft transmissible diseases;

ii. Infectious degeneration and leafroll complex are the most damaging and widespread virus diseases of grapevine and contemplated in the processes of clonal selection (table 1a);

1a. Main diseases: serious virus diseases in all viticultural areas, and test required.

Diseases to be controlled and excluded/eradicated from propagation material	Associated agents	Evident symptoms or on appropriate *Vitis* indicator[2]	Laboratory diagnosis
Infectious degeneration and decline[1], induced by *Nepoviruse*	- Grapevine Fanleaf virus, GFLV - Arabis Mosaic Virus, ArMV	Indicator: on *Vitis rupestris*	Serologicaly and/or, Molecular
Leafroll Disease[1]	Grapevine Leafroll associated Virus, GLRaV 1, 2, 3	Visible in varieties rich in anthocyanins or in *Vitis* indicators	Serologicaly and/or, Molecular

1: Appropriate indicators should be chosen from the plants according to relevant technical standards only on selection phase (e.g. EPPO PM 4/8 (2); Pathogen-tested material of grapevine varieties and rootstocks http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2338.2008.01258.x/full).

Information on the known grapevine viruses is provided by:

- Martelli, G.P. (2014): Directory of the virus and virus-like diseases of the grapevine and their agents. Journal of Plant Pathology 96, No 1 Sup.
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- Reynard, J.-S., Schaerer, S., Gindro, K., Viret, O. 2019. La Vigne (volume 3) Virus, Bactéries et Phytoplasmes (Edition AMTRA, Lausanne), pp.278.

Table 2. List of phytoplasma diseases of grapevine

Molecular diagnostic tests are available with PCR test, real time PCR for identification and detection of grapevine phytoplasmas from the mother plant material present in the nursery, in ampelographic collections. Tests carried out on woody material are not safe in order to exclude phytoplasmas in propagation material.

Diseases	Acronym	Pathogen	Phylogenetic group / sub-group	Main vectors to the grapevine	Categoria
Flavescence dorée	FD	Grapevine flavescence dorée phytoplasma	16SrV-C, 16SrV-D and genetic variants	Scaphoideus titanus	Quarantine organism in Europe
Bois noir	BN	Ca. Phytoplasma solani	16SrXII-A, F, G, J, K	Hyalesthes obsoletus, Reptalus panzeri and other local leafhoppers	
Palatinate Grapevine Yellows	PGY	Alder Yellows Phytoplasma	16SrV-C	Oncopsis alni	
Australian Grapevine Yellows	AGY	Ca. P. australiense Ca. P. australasia -	16SrXII-B 16SrII-D	unknown	

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North American Grapevine Yellows	NAGY	Ca. P. asteris Ca. P. pruni	16SrI-A 16SrIII-A	unknown	
Other Grapevine Yellows	GY	Ca. P. asteris	16SrI-B	unknown	
Buckland valley Grapevine Yellows	BVGY	Buckland valley grapevine yellows P.	16SrXXIII	unknown	
Aster yellows of grapevine	AY	Ca. P.asteris	16SrI	Mgenia fuscovaria Aconurella prolixa	
Chilean Grapevine Yellows	ChGY	Aster yellows P. Western X-disease P. Elm yellows P. Ash yellows P. Ca. P. solani	16SrI-B, 16SrI-C 16SrIII-J 16SrV-A 16SrVII-A 16SrXII-A	unknown	

Table 3. Excerpt of phytosanitary hot water treatment techniques for some vine diseases on material propagation.

Disease or treatment	Temperature of water	Type of material	Duration	Country	References
Phytoplasmas (FD and BN)	50°C	Cuttings and dormant top graft cuttings (scions) or dormant grafted vines	45 min	EPPO (Italy, France, etc)	• Method by Caudwell et al. 1991 • Manini *et al.*, 2007 and 2009 • EPPO Standard 10/18(1), DOI: 10.1111/epp.2594

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Industry and Interstate conditions within Australia	50°C	Cuttings and dormant top graft cuttings	30 min	Australia	• AS588 Australia
Xylella fastidiosa	50°C	Cuttings and dormant top graft cuttings	45 min	Europe	• EFSA scientific opinion, 2. Sept. 2015, doi:10.2903/j.efsa.2015.4225
Partially *Agrobacterium vitis* and several other pests	50°C	Dormant canes	45 min	EPPO	• EPPO Standard 10/18(1), DOI: 10.1111/epp.2594
General treatment	50°C	Not detailed	45 min	FAO/IBGRI	• FAO/IBPGR Technical Guidelines for the Safe Movement of Grapevine Germplasm •
	45°C	Not detailed	3h	FAO/IBGRI	

ANNEX B: Quarantine pest lists by country

In order to comply with national and international laws, OIV strongly recommends consulting each quarantine pest lists by concerned countries or these provided by the International Plant Protection Convention (IPPC: https://www.ippc.int/). However, OIV can provide some useful links in the Quarantine pests list of vine plants and grapes for OIV (http://www.oiv.int/public/medias/3310/quarantine-pests-list-vine-plants-and-grapes-oivvf.pdf).

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[1] The list of NPPOs of IPPC Contracting parties is available via the IPPC website: https://www.ippc.int/en/countries/nppos/list-countries/. The list of Regional Plant Protection Organizations (RPPOs) is also available via the IPPC website: https://www.ippc.int/en/external-cooperation/regional-plant-protection-organizations/

[2] For more details see the phytosanitary terms used by NPPOs relating to the exchange and production of plant material provided by FAO/IPPC International Standard for Phytosanitary Measures No. 5 Glossary of phytosanitary terms.

[3] International Union for the Protection of New Varieties of Plants

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