RESOLUTION OIV-VITI 564A-2017

OIV PROCESS FOR THE CLONAL SELECTION OF VINES

THE GENERAL ASSEMBLY

AT THE PROPOSAL of Commission I “Viticulture”,

IN VIEW of the article 2, paragraph 2 iv of the Agreement of 3rd April 2001, established by the International Organisation of Vine and Wine, and under the point 1.C.iii of the OIV Strategic Plan 2015-2019, which foresees to ”Promote knowledge on the functional genomics of the vine and micro-organisms”,

CONSIDERING many works presented during the meetings of the expert groups and particularly the "Genetic Resources and Vine Selection" Expert Group, and following a proposal made by this group of experts - “GENET” and;

CONSIDERING many works presented during the meetings of the expert groups and particularly the "Vine Protection" Expert Group, and following a proposal made by this group of experts “PROTEC” and;

CONSIDERING Resolution OIV/ VITI 6/1990 and OIV/ VITI 1/1991 in the OIV Standard programme for the clonal selection of grapevine, concerning clone obtainment, reproduction, conservation and propagation;

CONSIDERING that for many varieties and in several viticultural countries there is an objective to provide the greatest possible number of clones to wine-growers, with the purpose to provide the greatest possible intravarietal variability/diversity,

CONSIDERING the advances in scientific research and diagnostic’s techniques, as well as the different criteria for grapevine clone selection, used in several countries members of the OIV,

CONSIDERING that operational times should be reduced for the selection of clones and to speed up the pre-multiplication processes and propagation of the new clones,

DECIDES to define the term “selected clone” and to update and replace the standard protocol for the clonal selection of vines VITI 1/1991.

Table des matières

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CLONAL SELECTION

1.1. Selection of initial material – step one

1.2. Observation and conservation of the vegetative progeny of selected individuals – step two

1.3. Full study of selected individuals in step 2 – step three (optional)

Phytosanitary inspection of selected individuals

Registration of new clones

Conservation of new clones

References

Annex I: Clonal selection scheme refers to phytosanitary and genetic selection procedure).

Annex II: Evaluation of cultural aptitudes of candidate clones for wine varieties

Annex III: Recognized tests to detect different virus agents during the clonal selection.

Standard protocol for the clonal selection of grapevine varieties

INTRODUCTION

Clonal selection in the grapevine exploits and places value on the intra-varietal genetic variability of species. This genetic variability originates predominantly by spontaneous natural mutations which become fixed by vegetative propagation.

The probability for the existence of intravarietal variability increases with an increased age of the vineyards. It also increases for varieties which are known to be cultivated for a long time which are widely distributed and which occupy a considerable portion of the vine growing acreage.

Clonal selection endeavours to identify single individuals with positively modified characteristics as defined by the objectives of the selection process' within the particular variety. These characteristics may apply to different categories of phenological traits (e.g. ripening time), yield and quality parameters (e.g. aroma profile) or disease sensitivity and resilience.

The selection of suitable genetic mutations must be accompanied by phytosanitary tests in order to obtain healthy (free from harmful organisms) clones.

For the process of clonal selection OIV recommends the protocol (reported in annex I, annex II and annex III).

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Definition of selected clone

A clone is the vegetative progeny of a single vine plant. For selection purposes this single plant is chosen for its varietal identity, its phenotypic traits and its sanitary state.

CLONAL SELECTION

1.1. Selection of initial material – step one

Clonal selection is most efficient when initial individuals are preferably selected from vineyards planted without selected clones or before selection started in the considered country / region. In these vineyards intra-varietal variation is more likely, increasing the probability that apparently superior individuals concerning the target traits of the clonal selection program can be selected. Furthermore they must meet the desired requirements for other important viticultural traits. In addition, the selected individuals must be identified as true to type based on ampelographic and/or genetic investigations. This initial selection should be carried out with ampelographic and phenological evaluations. Furthermore, selection should take care to eliminate the individuals affected by transmissible and transferable diseases.

1.2. Observation and conservation of the vegetative progeny of selected individuals – step two

Selected individuals – they may derive from various regions and/or sites – which successfully complete the phytosanitary inspection, (see annex I) will be propagated individually and will be planted in a comparable trial, preferably under two environments with different pedoclimatic characteristics. For comparison purposes, this trial should include for reference one or more existing standard clones. The test plot should exhibit homogenous soil and micro climate conditions. The soil of the test plot must be free of Xiphinema ssp., acting as vectors for virus diseases. The whole trial shall be grafted on the same clone rootstock. The rootstock used for grafting shall be adapted to the local soil conditions, preferably one of the most frequently used rootstock in this area. Each candidate clone should be planted at least with 5 vines replicated at least three times. Evaluation should be carried out during a period of three to five years. In the case of wine grapes should include the characters mentioned in annex II.

Additionally, further traits may be included, especially those which are of special regional interest or more relevant for characterizing the typology of obtained product.

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Based on the data collected over at least a three year's period, a ranking concerning the "general performance" of the clone candidates can be made, considering also specific target traits of interest in the frame of the running clonal selection program.

The characteristics to be considered in clonal selection should be in accordance with the final products (rootstocks, table grape and raisin, juices, etc). Regarding the quality of table grapes dispositions on resolution OIV-SCRAISIN 371-2008 should be taken into account.

1.3. Full study of selected individuals in step 2 – step three (optional)

The candidate clones with most suitable performance data from the previous evaluation cycle will be multiplied for further observations. In this subsequent testing cycle, the investigations shall be performed:

- On several locations, when possible;
- On several rootstocks (most frequently used in country resp. growing area);
- With sufficient plants per clone in order to get a proper quantity of grapes for micro-vinification;
- Experimental trial design with a minimum of three repetitions per clone candidate.

Whenever possible, use appropriate, statistically-sound, experimental designs and models for data analysis when assessing phenotypically the genetic value of plant variations, to make sure it is effectively separated from the associated environmental deviation;

Evaluations will be carried out for the same characteristics as in the previous testing cycle in step 2 with special focus on quality parameters (see annex II). Evaluations including vinifications shall be carried out for at least two years. Data collected within this testing cycle provide a solid base for the assessment of clone candidates for the investigated traits. Moreover due to different environments and different rootstock combinations the ecovariance of clone candidates can be calculated.

Whenever possible, an estimation of the foreseeable genetic gain to acquire from the selection should be made.

Phytosanitary inspection of selected individuals

Individuals selected in step one should be tested for those virus diseases listed in

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annex III. However, tests are obligatory according to the national legislations. Depending on the regional or national significance, other virus diseases may be also tested additionally. For phytosanitary tests all scientifically approved protocols like biological indexing, serology test (ELISA) or molecular (PCR, rtPCR, NGS)-techniques can be applied.

It is recommended to keep only those individuals which prove to be free of harmful diseases. However, in some cases, for example if the initial varietal population is mostly disease infected and healthy individuals are difficult to identify, the application of cleaning protocols may be justified. This can be done by thermotherapy followed by shoot tip or meristemic apex culture. In any case, with phytosanitary recovered clones, the checks must be carried out according to the procedure described in step 2.

Following this scheme only healthy clone candidates will be transferred to the consecutive testing cycles.

Registration of new clones

Candidate clones which passed the genetic, agronomical and phytosanitary selection procedure successfully can be apply for official registration by the competent national authorities. Whenever possible, selection work should take into account the Genotype by Environment (GxE) interaction and should provide full public disclosure of all measures taken to reduce its impact on the genetic gain from the selection.

The registration requires a unique denomination or codification of the varietal clone. Furthermore the registration confirms that the new clone is derived from the respective variety.

Conservation of new clones

Individuals of the new clones (either the initial nuclear stock or individuals propagated from the nuclear stock), which are proven to be free from all diseases listed in Annex III (confirmed by laboratory tests) should be grown under conditions that avoid any coincidence with vectors of diseases and any infection with virus diseases. They must be grown in soil, which is free of virus vectors, preferably as potted vines in greenhouse. Any contact with potential disease vectors like aphids, scales and leafhoppers for example shall be prevented. Periodical phytosanitary inspection shall be performed in order to confirm the phytosanitary clean status of the clone.

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Annex I: Clonal selection scheme refers to phytosanitary and genetic selection procedure).

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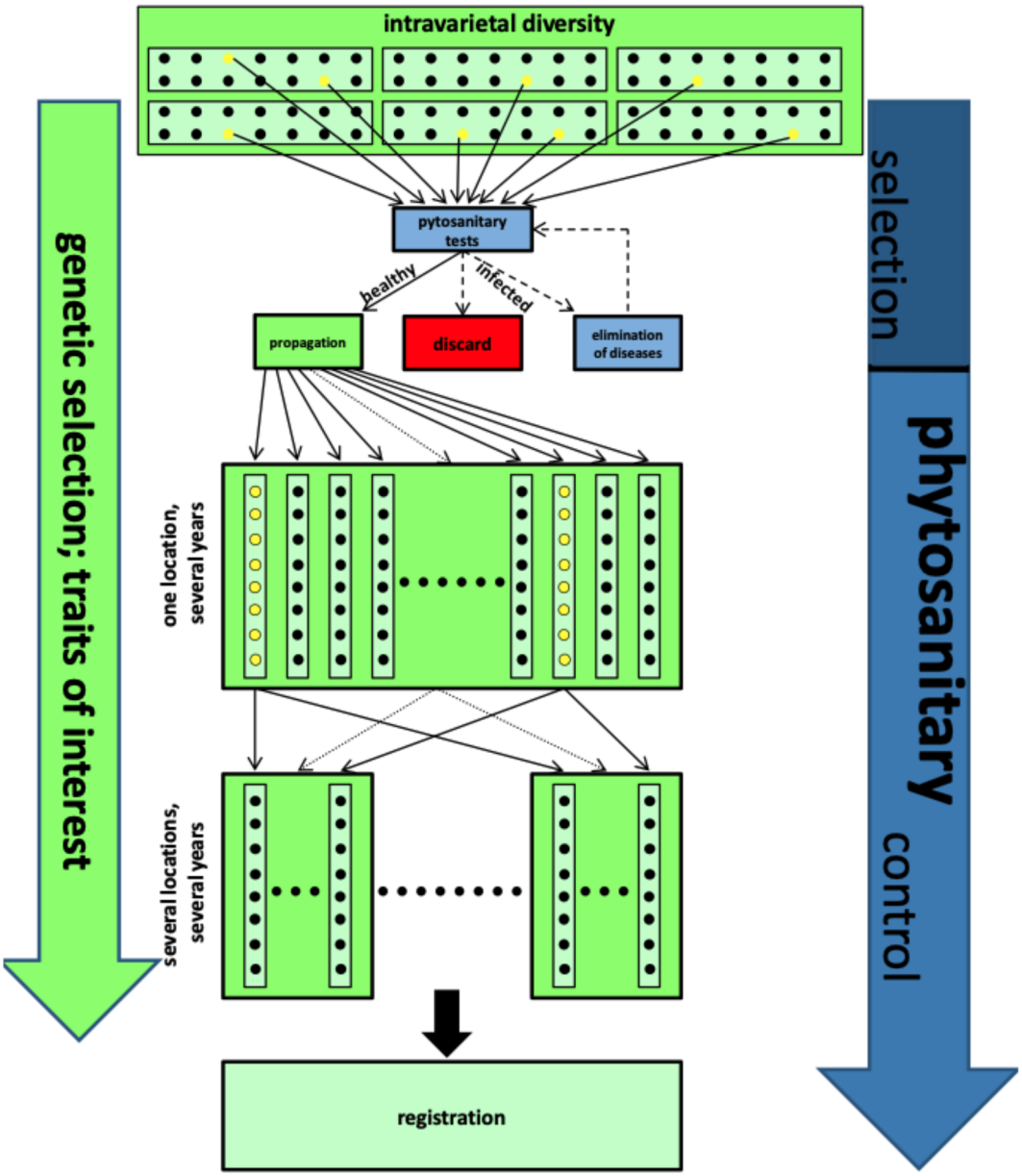
Scheme of clonal selection



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Secretary of the General Assembly
Jean-Marie AURAND

Annex II: Evaluation of cultural aptitudes of candidate clones for wine varieties

A. Phenological data:

- Time of bud burst (code OIV 301), defined as the date when 50% of the buds of the plant are in green tip stage (stage C of Baggiolini scale, stage 7 to 9 of BCCH scale);
- Time of full bloom (code OIV 302), defined as the date when 50% of the flowers are open (stage I of Baggiolini scale, stage 65 of BCCH scale);
- Time of beginning of berry ripening (veraison, code OIV 303), defined as the date when 50% of the berries on the plant grapes have reached veraison (stage M of Baggiolini scale, stages 81 to 85 of BCCH scale);
- Physiological ripeness (=optimal harvest time).

B. Sensivity characteristics resp. factors affecting resistance characteristics

- Degree of resistance to Botrytis cinerea (code OIV 458) as well as other diseases and pest including further physiological diseases of viticultural relevance,
- Density of cluster (OIV code 204).

C. Yield parameters

- Berry size
- Cluster size
- No. of clusters per shoot
- Yield per vine

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A. Quality parameters

- Sugar
- Acid
- pH
- Berry and juice taste (aroma intensity and profile)
- Polyphenols
- Taste profile of wine (if microvinification is feasible)
- Rating of wine quality (if microvinification is feasible)

Micro vinification is desirable, unless case of first clone selection for a given variety.

Annex III: Recognized tests to detect different virus agents during the clonal selection.

Disease	Associated agents for which testing is required[1]	Symptoms in appropriate indexing indicators[2]	Laboratory diagnosis[3]
a- Infectious degeneration and decline	• Grapevine Fanleaf virus, GFL • Arabis Mosaic Virus, ArM	Visible	Serology, Molecular
b -Leafroll Disease	Grapevine Leafroll associated Virus, GLRaV 1, 2, 3, 4, 7	Visible	Serology, Molecular
c- Rugose wood	• Grapevine Virus A, GV • Grapevine Virus B, GVB	Visible	Serology, Molecular

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d- Other grapevine viruses[4], e.g. • Other European and American Nepo-Viruses • Grapevine Fleck Virus, GFkV • Grapevine Rupestris Stem Pitting associated Virus, GRSPaV - Grapevine Corkybark, GCB • Grapevine Redglobe Virus, GRGV • Grapevine Pinot Gris Virus, GPGV • Grapevine Stunt Virus, GSV • Agents associated with grapevine vein necrosis complex	Visible or latently infecting	Molecular as far as routine protocols are available

[1]Further infectious agents may be considered if diagnostic techniques are available

[2] Appropriate indicators should be chosen according to relevant technical standards only on selection phase (e.g. EPPO PM 4/8 (2))

[3] If possible, application of next generation sequencing (NGS) as an advanced diagnostic technology should be considered for future requests to bilateral accords

[4] Testing for other grapevine viruses (not listed in points a, b, c) is currently not required. These and other pests and diseases, that may be present in the territory and can produce vine declines, must be considered.

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