

THE EUROPEAN VITIS DATABASE

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The history of *Vitis* databases

Owing to the threatening of *Vitis* germplasm world-wide, already in the late 1970-ties, viticulture experts of the OIV and IBPGR (today IPGRI) pointed out (1) the urgency of germplasm collection because of the losses of wild forms and old autochthonous varieties of *Vitis*, the maintenance of *Vitaceae*, *Vitis* species and cultivars and clones in repositories and (2) the necessity of international co-operation in their characterisation and evaluation and the free exchange of genetic material (O.I.V. General Assembly Resolution No 2/82) (Dettweiler, 1990).

Following the recommendations of the experts, in 1983 the inventory of the world-wide existing *Vitis* species, varieties and genotypes grown in grapevine collections has been started by the Institute for Grapevine Breeding Geilweilerhof. Initial support was obtained from IPGRI and the O.I.V. The resulting *Vitis* International Variety Catalogue (VIVC) is accessible via Internet since 1996 (<http://www.genres.de/idb/vitis/vitis.htm>). It provides an inventory of the grapevine genetic resources with passport, primary and secondary descriptors, bibliography and photos.

Within the EU-project GENRES CT96 No 81 (Genres081) „European network for grapevine genetic resources conservation and characterisation“, which ran from 1 March 1997 to 30 September 2002 one of the objectives was the establishment of an European *Vitis* Database (ECVD).

From the 19 Genres081 partners out of 14 countries (Austria, Bulgaria¹), Croatia¹), Czech Republic¹), France, Germany, Greece, Hungary¹), Italy, Moldavia¹), Portugal, Slovenia¹), Spain, Switzerland¹) - for countries marked by „¹)“, funds have been provided by IPGRI), 18 maintain a grapevine collection. The number of accessions preserved per collection varies between 200 and 7.200. In total by Genres081 approximately 27.000 accessions passport data have been recorded in the European *Vitis* Database (<http://www.genres.de/eccdb/vitis/>).

In the meanwhile a searchable catalogue of ex situ collections in Europe, called EURISCO - standing for European Internet Search Catalogue (<http://eurisco.ecpgr.org>) was created within the EC-funded project EPGRIS (<http://www.ecpgr.cgiar.org/EPGRIS/Index.htm>). EURISCO is based on reviewed FAO / IPGRI Multicrop Passport Descriptors (MCPD), which are acknowledged by international genetic resources databases and which are promoted to be used worldwide.

This development motivated the members of the ECP/GR Working Group on *Vitis* during their 1st meeting in Palic in June 2003, to adopt the FAO / IPGRI MCPD for the European *Vitis* database too. It was decided that the Genres081 partners adapt their passport data according to the agreed format not later than the end of 2004. Other working group members and representatives from observer countries had to provide their accession passport data in the agreed format by the end of 2003 (IPGRI 2004).

Today with regard to the preservation and sustainable use of *Vitis* germplasm it can be stated that both databases are actively supporting and enhancing the (1) the maintenance of genetic resources, (2) the differentiation and identification of grapevine varieties and (3) the availability and exchange of germplasm. In addition they are an information platform for research, breeding and viticulture by providing grapevine variety specific data.

The European *Vitis* Database

The European *Vitis* Database is an accession linked database – which is not the case for the VIVC. Each accession is identified by its accession number (see figure 2), which is indispensable owing to the high number of misnamed, synonymous or homonymous grapevine varieties amounting to about 5 to 10% in the world-wide grapevine collections (Dettweiler 1992) and owing to different spelling (e.g. Bahran Chirei, Bahian Shirei, Baian Schirei, Baianshyra, Bayan Shirei, etc.).

Thus, every record (passport, primary, secondary descriptor data, pictures and STMS-markers) was assigned to the corresponding accession from which the information was taken.

Passport descriptors adopted by Genres081 are the following: official name of the cultivar, berry colour (B=blanc, G=gris, RG=rouge, RS=rose, N=noir), accession no in the collection, name in the collection, country of origin, source of the material, date of entry into the collection, *Vitis* species, parentage, breeder, use (W=wine, T=table, R=raisin, RS=rootstock), yes/no field (remark: yes was given for cultivars with verified identity, no for cultivars with uncertain identity) and remarks (e.g. observed synonyms).

Passport Data	
ID Number:	6089
Species:	<i>Vitis vinifera</i> L.
Accession Number:	211Mtp1
Accession Name	Gouais Blanc
Colour of the berry:	Green
Holding Institute:	INRA-ENSA.M, UR.GAP-Viticulture Montpellier, France
Donor Institute:	COLL. RAVAZ 7A88,2 GUICHARD AUBE
Use:	Wine
Additionally Information:	Vitis International Variety Catalogue
Picture:	

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Fig. 1: European *Vitis* Database: **Gouais blanc**, a synonym to **Heunisch weiss**, with its accession number and the link to the *Vitis* International Variety Catalogue (VIVC).

The ECVD and the VIVC are linked if the true-to-typeness of varieties in the European *Viti*. Database is given.

54 primary (33 ampelographic, 21 ampelometric) and 16 secondary descriptors (for an example see figure 2) have been selected from the OIV Descriptor List for Grape Vine Varieties and *Vitis* Species (OIV 1983) to be recorded by Genres081. Owing to experiences gained whilst four years of descriptor recording descriptors were modified if necessary by Genres081. For the definition of the utilized descriptors see the ECVD or the published lists “Primary Descriptor List for Grapevine Cultivars and Species (*Vitis* L.)“ (Anonymous 2002a) and „Secondary Descriptor List for Grapevine Cultivars and Species (*Vitis* L.)“ (Anonymous 2002b).

Since 2002 experts of IPGRI (IPGRI 1997), UPOV (UPOV 1997) and OIV are working on the harmonisation of their grapevine descriptor lists (Maul 2004). Considering the different purposes for which descriptors are used by these three institutions, a complete coincidence is not realistic. But an approximate standardisation would facilitate data recording and promote exchange of data.

Carattere: Epoca del gemogliamento Caractère: Époque du bourgeonnement Merkmal: Beginn des Knospenaustriebs Characteristic: Time of bud burst Carácter: Epoca de la brotación	Codes OIV 301 UPOV 1 IPGRI 7.1.1.
Livelli di espressione / Notation / Bonitierung / Notes / Notación:	
1 3 molto precoce très précoce sehr früh very early muy precoz	5 precoce précoce früh early precoz
7 media moyenne mittel medium media	9 tardiva tardive spät late tardia
molto tardiva très tardive sehr spät very late muy tardia	
Varietà di riferimento / Exemples de variétés / Beispielsorten / Example varieties / Ejemplos de variedades:	
1 V.amurensis V.romaneti	3 Chardonnay B
5 Cabernet Sauvignon N	7 Mourvèdre N
9 Airén B	Trebbiano Toscano B
Indicazioni / Définitions / Definitionen / Definitions / Indicaciones: I: Osservazione da effettuare quando il 50% delle gemme si trova allo stadio di punta verde (stadio C di Baggolini). F: Observation à faire quand 50% des bourgeons se trouvent au stade pointe verte (stade C de Baggolini). D: Feststellung wenn bei 50% der Knospen die grüne Spitze deutlich sichtbar ist (Stadium C nach Baggolini). E: Observation when 50% of the buds are in green - tip stage (stage C of Baggolini). S: Observación a realizar cuando el 50% de las yemas se encuentran en el estado de punta verde (estado C de Baggolini).	
 <p>Gemma: Stadio punta verde Bourgeon: Stade pointe verte Knospe: Stadium grüne Spitze Bud: Green - tip stage</p>	

Fig. 2: OIV descriptor 301: „Time of bud burst“.

ECVD search options

The European *Vitis* database designed by the ZADI / IGR offers multiple options for the search of *Vitis* specific information. The multiple fields option enables the combination of several fields for a search directed to specific objectives.

The two examples below – one for passport data- and another for primary- and secondary descriptor data search - will demonstrate the menu's flowing off.

Example for passport data: Search of a specific pedigree via „Multi Fields“

The objective is to find a grapevine variety with Cabernet Sauvignon as ancestor, black berry colour, utilised as a wine grape and available in Montpellier / France, as it is indicated in figure 3. These four fields have to be connected by the „and“ option, see the 9th row of the table.

European Vine Database

Multi Fields Search:

Species	<input type="text" value="-Select, please!-"/>
Accession Name	<input type="text"/> (Use % as wildcard, e.g. Riesling%)
Accession Number	<input type="text"/> (e.g. 40-06-030)
Holding Institute	<input type="text" value="INRA-ENSA.M, UR.GAP-Viticulture, France"/>
Colour of the Berry	<input type="text" value="Black"/>
Utilization	<input type="text" value="Wine"/>
Pedigree	<input type="text" value="% X Cabernet%"/> (Use % for masking, e.g. AMERICA%)
Order By	<input type="text" value="Accession Name"/>
Field Connector	<input checked="" type="radio"/> and <input type="radio"/> or
<input type="button" value="Search"/>	<input type="button" value="Correct"/>

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Fig. 3: Passport data: Pedigree search via „Multi Fields“. Choice of options.

At the end of the search a table is drawn, corresponding to the accessions fulfilling the requested criteria, see table 4.

European Vine Database

1 - 8 from 8						
No.	Accession Name	Accession Number	Colour of the berry	Country of Origin	Holding Institute	Further information
1	Maingonat 12 L 11	2552Mtp1	Black		Montpellier/France	details
2	Maingonat 42 L 10	2731Mtp1	Black		Montpellier/France	details
3	Manzoni 2-15	677Mtp1	Black		Montpellier/France	details
4	Manzoni 2-15	677Mtp2	Black		Montpellier/France	details
5	Manzoni 2-15	677Mtp3	Black		Montpellier/France	details
6	Ruby Cabernet	2313Mtp1	Black		Montpellier/France	details
7	Ruby Cabernet	2313Mtp2	Black		Montpellier/France	details
8	Terzi 1	6579Mtp1	Black		Montpellier/France	details

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Fig. 4: Passport data: Pedigree search via „Multi Fields“. Table with accessions corresponding to the request.

More information about the accessions are to be found if „details“ is clicked, see figure 5 with passport data, and if recorded, primary and secondary descriptor data and photos.

Имя:	
Additional Information:	Другие идентификации: Ruby Cabernet
Тип:	Вино
Родитель:	Синий х Сербский Златан
Донор института:	ДВА ИГ САГИБОВИЕ ПЗА
Холдинг института:	ИНВА-БИГА М, ПУБЛЪ-Андрей Монтфелетт, Франция
Цветок ягоды:	Черный
Имя доступа:	Буду Сербия
Номер доступа:	33131111
Вид:	Другие виды Г.
ID номер:	0383
Результат	

Fig. 5: Passport data of the accession Ruby Cabernet in the European Vitis Database.

Example primary descriptor data: search via „Multi Fields“

The objective is to find varieties with a late time of bud burst to avoid spring frost damages or to find varieties with an early bud burst which would benefit of a longer vegetation period in warmer climates.

In a first step the descriptor itself has to be examined (see figure 2) to get aware about the recording and the notation of the characteristic.

The desired information is to be obtained by choosing „Primary & Secondary Descriptors“, „Single Field“, where the descriptor scroll is available. By clicking time of bud burst and „Go“ the registered expression stages turn up, see figure 9. The table is listing the number of accessions (column 3) recorded for the indicated expression stages in column 2, occurrences. Expression stages can be mixtures of different notations when the expression appears to be in-between two consecutive notations. Owing to differing data registering, some notations occur twice or three times, see figure 9, because of two kinds of slashes used and with and without spacing between the numbers.

European Vitis Database		
Passport Data Single Field <input type="text" value="Accession Name"/> <input type="button" value="Go"/>		
Multi Fields		
Primary & Sec. Descriptors Single Field <input type="text" value="time of bud burst"/> <input type="button" value="Go"/>		
Multi Fields		
Pictures Single Field <input type="text" value="Accession Name"/> <input type="button" value="Go"/>		
Multi Fields		
Descriptors (Definition) Passport Descriptors Primary & Sec. Descriptors Introduction Descriptors		
Your Feedback		
GENRES #001 Vitis Internat. Variety Catalogue GENRES		
Home		
1 - 20 from 22		
No.	Occurrences	Number of Accessions
1	0	12
2	1	33
3	1 3	3
4	2	25
5	2 3	3
6	3	133
7	3 5	8
8	3 5	25
9	4	34
10	5	321
11	5 7	3
12	5 3	1
13	5 7	6
14	5 7	14
15	6	13
16	7	99
17	7 9	1
18	7 9	3
19	8	10
20	9	28
<input type="button" value="◀"/> <input type="button" value="▶"/> <input type="button" value="⏪"/> <input type="button" value="⏩"/>		

Fig. 6: Secondary descriptor data

By clicking the expression stage accessions corresponding to that notation turn up. Registered passport, primary and secondary descriptor data (figure 7) and photos are accessible by clicking „details“.

Passport Data	
ID Number:	13982
Species:	Vitis vinifera L.
Accession Number:	BGV CAM1104
Accession Name	Albillo
Colour of the berry:	Green
Holding Institute:	Instituto Madrileño de Investigación Agraria y Alimentaria (I.M.I.A.), Spain
Country of Origin:	SPAIN
Use:	Table, Wine
Edition Information:	Vitis International Variety Catalogue
Picture:	bayas / berries; racimos / bunches; sumidad / shoot tip; hojas / leaves;
Evaluation Data, Year 1999	
4th distal leaf: color	1
4th distal leaf: hairs lower side	7
berry: color of flesh	1
berry: color of skin	1
berry: length	14,6
berry: particular flavor	1
berry: presence of seeds	3
berry: shape	2
berry: weight	1,6
berry: width	13,8
bud scales: color distribution	1

Fig. 7: Passport and evaluation data, year 1999 of the accession

Albillo, recorded at I.M.I.A. / Spain.

The interest in *Vitis* related information is high. The frequency of use of the European *Vitis* database was provided by the Centre of Agricultural Documentation and Information / Institute for Biological Diversity (ZADI / IBV):

Frequency of use	January	February	March	April 2003
Homepage	838	712	563	540
Search for pictures	938	974	1250	865
Search for passport- and descriptor data	1545	1286	1165	862

Prerequisites for a smooth database management

For a smooth database management the agreed format and terms have absolutely to be respected. Database updating and expansion requires the strict adherence to the previously established rules. Switching the order of descriptor fields will result in confusing and not logic information. It will have considerable consequences, when e.g. the key field, which is the accession's code number, was modified over the time and not communicated respectively changed in the European *Vitis* Database. If an accession's code number registered in the database does not match with the accessions code number of the descriptor data and pictures, an assignment is impossible. The same happens if an accession's code number is existing twice. Concerning the primary and secondary descriptors, the indications given within the definitions have to be followed to ensure the comparability of the data from different sources. This concerns for example the units for length. If the berry length has to be recorded in mm, then all the accessions where the data were recorded in cm do not emerge in the right order. Or if for ampelometric descriptors numeric data are requested, the transformation in notations is not suited.

To avoid the incidences described above and to avoid extra work for data-set harmonization the ECP/GR working group on *Vitis* defined specific rules for descriptor recording (IPGRI 2004).

Conclusion

Vitis germplasm management and its sustainable use, e.g. cost-efficient and rational breeding programs require structured information about the performance of genotypes to be selected as parents. In other words, grapevine varieties of *Vitis* germplasm collections are more useful for breeders, as well as for research and winegrowers needing liable data on cultivars and species characteristics and aptitudes, if corresponding information of their properties are available.

Bearing this objective in mind the European *Vitis* Database has been developed thanks to the support of the European Commission and made available via the Internet thanks to the ZADI / IBV.

The European *Vitis* Database comprises currently: (1) passport descriptors of 27.074 accessions, (2) primary descriptor data of 802 accessions of rare old autochthonous grapevine varieties, (3) secondary descriptor data of 432 accessions of rare old autochthonous grapevine varieties and varieties of valuable germplasm for breeding (4) 2200 pictures illustrating different parts of the vine of 450 accessions, which are an excellent tool for grapevine variety recognition and (5) SSR-marker data of 6 microsatellites, which were applied on 46 different grapevine varieties.

The database structure itself enables the addition of:
passport data from further grapevine collections (= grapevine germplasm repositories)
grapevine varieties descriptor data
photographs of shoot tips, leaves, clusters and berries
SSR-marker data.

The individual accessibility of the European Vitis database with the possibility of online-modification by each partner is envisaged.

References

1. Dettweiler, E. 1990. Genetic resources – Gene banks. *Vitis* 29, 57-59. Newsletter 1.
2. Dettweiler, E. 1992. The grapevine herbarium as an aid to grapevine identification - First results. *Vitis* 31, 117-120, Newsletter 4.
3. Anonymous. 2002a. Primary Descriptor List for Grapevine Cultivars and Species (*Vitis L.*), Institut für Rebenzüchtung Geilweilerhof, 76833 Siebeldingen, Germany.
4. Anonymous. 2002b. Secondary Descriptor List for Grapevine Cultivars and Species (*Vitis L.*), Institut für Rebenzüchtung Geilweilerhof, 76833 Siebeldingen, Germany.
5. IPGRI. 1997. Descriptors for Grapevine (*Vitis spp.*). 2nd edition. IPGRI, Via delle Sette Chiese 142, 00145 Rom.
6. IPGRI. 2004. Working Group on *Vitis*. Part I. Discussion and Recommendations. First meeting – 12-14 June 2003 – Palic, Serbia and Montenegro.
7. Maul, E. 2004. Harmonization of IPGRI, OIV and UPOV descriptors for *VITIS*. IPGRI. 2004. Working Group on *Vitis*. First meeting – 12-14 June 2003 – Palic, Serbia and Montenegro.
8. OIV. 1983. Merkmalsliste für Rebsorten und Vitisarten. OIV, 11 rue Roquepine, 75008 Paris.
9. UPOV. 1977. Richtlinien für die Durchführung der Prüfung auf Unterscheidbarkeit, Homogenität und Beständigkeit "Rebe" (*Vitis spec.*), Genf.

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