

# American and Hybrid Grapevines (*Vitis Spp.*): A new concept of invasive plants to Europe

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## Abstract

Most part of the wild specimens of grapevines, usually attributed to *Vitis vinifera* subsp. *vinifera* though Europe, really belong to a complex group of foreign invader taxa –both true species and hybrids-, like *V. riparia*, *V. rupestris*, *V. berlandieri*, *V. labrusca*, etc. It deals with the naturalized forms of the rootstocks, mostly coming from North America, and initially used to graft on the European grapevine, in order to defend it against the attack of the phylloxera disease. It deals with a special case of new invader plants, which can show an extreme genetic complexity –i.e., wild specimens of the multi-hybrid *Vitis aestivalis x berlandieri x cinerea x labrusca x riparia x rupestris x vinifera* have been recently found in Spain-.

## Introduction

As a result of the European policy of abandonment of the grapevine crop, millions of cultivated plants have become naturalized plants. However, the surviving plants are not the true wine producer –the European grapevine (*Vitis vinifera* subsp. pl.)- which could not stand the phylloxera disease (*Phylloxera vastatrix*) -GALET, 1988; CAMPBELL, 2004-. On the contrary, the surviving plants are the resistant rootstock used to graft on the European species since the XIXth century (LAGUNA, 2003a). The abandoned cuttings and plants are becoming very aggressive invaders of roadsides, field edges and riverine vegetation –see the commonest cases at table 1-. Fruit production is abundant and edible to be eaten by frugivore birds (LAGUNA, 2003b)

## Material and Methods

The author has collected field material through Spain, Portugal, Rumania, Czech Republic, Slovakia, Southern France and Italy, including their main islands; references from Southeastern Europe have been received through letters and scanned images of herbarium specimens send by contributors from Croatia, Slovenia, and Greece. The field samples have been transferred to the Herbarium VAL (Botanic Garden of the University of Valencia). The specimens have been identified using the determination keys of OLIVIERI (1936), SAVULESCU (1952-76), GALET (1989), MOORE (1987, 1991) and LAGUNA (2003a and 2004).

## Results and Discussion

More than 30 taxa, most of them artificial hybrids, have been found or registered in wild –see some leaf shapes and sizes represented in fig. nr. 1-. The most frequent and/or abundant taxa are listed below –see tab. nr. 1-. The identification of the most complex species –mainly thinking of polihybrids, where the genetic material of 3 or more species are forming part of- can be quite difficult (LAGUNA, 2003a and 2004); in addition, some hybrids cannot be well separated of *Vitis vinifera* subsp. *vinifera*. Some of the species, like *V. rupestris*, *V. riparia* and several hybrids of *V. berlandieri*, have become severe invaders covering hundreds of km of the main roadsides and ravines through Spain, France and Italy.

In most part of Europe, the botanists are not aware of this new problem, due that they were confident that the wild forms they found belonged to *V. vinifera* L. subsp. *vinifera*, a species with huge morphological variability (GALET, 2000). However *V. vinifera* –both ssp. *vinifera* and subsp.

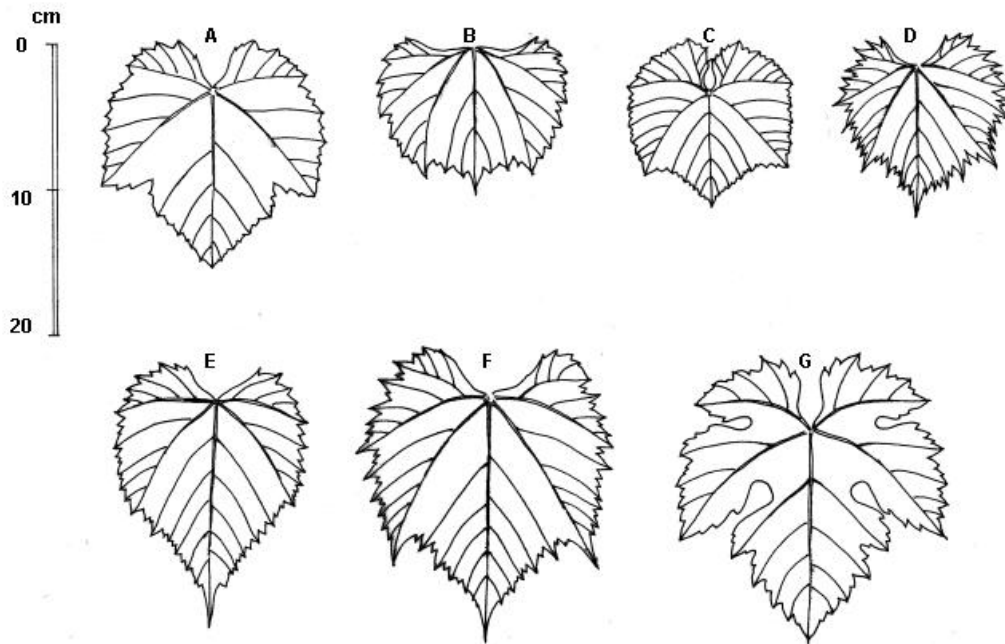
*sylvestris*- is becoming quite a rare plant in wild, because it is easily destroyed by *Phylloxera vastatrix* attack. *V. vinifera* subsp. *sylvestris* seems to be an extinct species in most part of the Western Mediterranean area -but never appearing in red lists;. Simultaneously, the invasive non-native or artificially created hybrids of grapevines, are becoming the most abundant invasive ligneous species -being nowadays more widespread than classical invaders such as *Ailanthus altissima*, *Acer negundo*, *Robinia pseudoaccacia*, etc.

The rootstocks do not correspond to the usual concept of 'species'. In the best cases it deals with cultivars of American uncrossed species (usually *V. rupestris*, *V. riparia*, and sometimes *V. labrusca* or *V. berlandieri*), or simple hybrids between them ('American-American hybrids'), and/or with the European grapevines (American-European hybrids). However, there are also a lot of multi-hybrids whose genetic information is the result of complex crossings amongst 3 or more species (GALET, 1989; LAGUNA, 2003a). These complex combinations are also common in the so-called 'hybrid direct producers', plants coming from the inter-specific cross between phylloxera-resistant American plants, and the European one, being able to directly produce grapes for juice (GALET, 1989). No other group of cultivated plants enclose such a genetic complexity, coming from the combinations of more than 10 inter-fertile species. Subsequently, the future generations, coming from the outbreeding of simple and multiple hybrids, can yield new nothospecies quite impossible to be named and/or identified. For instance, we have recently found in Castellon (Valencia) a naturalized 'generation 0' -coming from abandoned cuttings and still not crossed in wild- of the nothospecies *Vitis aestivalis* x *berlandieri* x *cinerea* x *labrusca* x *riparia* x *rupestris* x *vinifera* (LAGUNA, 2004).

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**Fig. nº 1.** Representation of leaves of several pure species of *Vitis* L., most of them found in wild habitats in Southern Europe (extracted from LAGUNA, 2003a; courtesy of *Flora Montiberica*). A: *V. labrusca*; B: *V. rupestris*; C: *V. berlandieri* (= *V. cinerea* var. *helleri*); D: *V. acerifolia* 'Solonis' (= *V. solonis*); E: *V. cordifolia* (incl. in *V. vulpina*); F: *V. riparia* (small-sized leaf; typical leaves are over 254 cm); G: *V. vinifera* subsp. *vinifera* (penta-lobed leaf)



**Table n° 1.-** Commonest non-native species of *Vitis* found in wild (generation '0', naturalized from abandoned cuttings or removed rootstocks) in Southern Europe

Taxonomic identity	Origin (3)	Commonest varieties found in Southern Europe			Rarities (4)
		Rootstocks	Wine/Grape producers	Ornamentals	
<i>V. acerifolia</i> Raf. (1)	North America	Solonis, Novo-Mexicana			M
<i>V. acerifolia x berlandieri</i>	Artificial	31R			R
<i>V. acerifolia x riparia</i>	Artificial	1616 C			R
<i>V. amurensis</i> Ruprecht	Siberia			Amourski	R (5)
<i>V. berlandieri</i> Planchon (2)	North America	Résseguier 2			R
<i>V. berlandieri x riparia</i>	Artificial	161-49 C, 34 EM, 420-A Mgt, Teleki 5BB, SO4, 8B			C
<i>V. berlandieri x rupestris</i>	Artificial	99 R, 110 R, 1103 P, 140 Ru			C
<i>V. berlandieri x vinifera</i>	Artificial	333 EM, BC1, Fercal, 41B			C
<i>V. berlandieri x riparia x rupestris</i>	Artificial	1119 P			M
<i>V. coignetiae</i> Pulliat	Japan			Nakai	R (5)
<i>V. labrusca</i> L.	North America		Isabelle	Isabelle	M (5)
<i>V. labrusca x riparia</i>	Artificial	Vialla	Clinton, Noah		R
<i>V. labrusca x riparia x vinifera</i>	Artificial		Othello, 22A		R
<i>V. riparia</i> Michaux	North America	Gloire de Montpellier, Grand Glabre, Tomentosa			M (5)
<i>V. riparia x rupestris</i>	Artificial	3306 C, 3309 C, 101-14 Mgt, 6736 C			C
<i>V. riparia x vinifera</i>	Artificial		1 Baco		M (6)
<i>V. riparia x rupestris x vinifera</i>	Artificial	196-17 C			M
<i>V. rupestris</i> Scheele	North America	De Lot, Martin, Metallique			C
<i>V. rupestris x vinifera</i>	Artificial	1202 C, Aramon-Rupestris Ganzin 1			M

(1) including *V. solonis* Hort. Berol ex Planchon and *V. longii* Prince

(2) Syn.: *V. cinerea* (Engelm. in Gray) Engelm. ex Millardet var. *helleri* (Bailey) M.O. Moore

(3) In addition, some artificial hybrids between American species are also found in wild in USA

(4) Data from personnel observations in Western and Central Mediterranean. C: Common, abundant; M: Medium abundance (frequent but not abundant); R: Rare

(5) Species becoming commonest towards North, on sub-Mediterranean sites; also on the rainy sites of the Eastern Mediterranean area and/or towards the Black Sea region. These species use to appear as escaped ornamental plants in warm places of N and NW Europe

(6) The generation '0' is unusual. Most plant found in wild become from the crossing of cultivated *V. vinifera* varieties by naturalized *V. riparia*, as a first or further sexual generations.