Alien grapes (*Vitis*, Vitaceae) in Sicily (Italy): novelties for the Sicilian and Mediterranean flora

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**Abstract** - With the aim to improve and update the information on distribution and invasiveness of the genus *Vitis* across the Euro-Mediterranean area, the authors explored Sicily (Italy), one of the world most important areas for viticulture, where this taxonomic critical group seems to have been neglected on floristics grounds. One naturalized (*V. ×goliath*) and two invasive taxa (*V. ×instabilis*, *V. ×ruggerii*) are reported for the first time from this region, while the presence of *V. labrusca* and *V. ×koberi* is confirmed. *V. rupestris* and *V. ×ruggerii* are recorded as invasive for the first time in the Euro-Mediterranean area, while the invasion status of *V. labrusca* is changed from casual to naturalized for Sicily. Previous literature data on *V. berlandieri* and *V. riparia* are discussed: the former species is excluded from the Sicilian flora, while the latter is regarded as doubtfully present. Additionally, the first record of *V. ×ruggerii* from Greece (Crete) is reported; this neophyte was previously unknown from eastern Mediterranean.

**Key words:** viticulture, *Vitis ×goliath, Vitis ×instabilis, Vitis ×koberi, Vitis labrusca, Vitis ×ruggerii, Vitis rupestris.*

**Parole chiave:** viticoltura, *Vitis ×goliath, Vitis ×instabilis, Vitis ×koberi, Vitis labrusca, Vitis ×ruggerii, Vitis rupestris.*

**INTRODUCTION**

In the second half of the 19th century, European vineyards fell victim to grape phylloxera (*Daktulosphaira vitifoliae* (Fitch, 1855), Phylloxeridae), a North American insect, closely related to aphids, feeding on roots and leaves of grape-vines (*Vitis* L.). The first phylloxera attacks were recorded from France in 1863 and, in less than two decades, the new pest spread over the western and southern coasts of the Mediterranean basin, reaching Sicily in 1880, where it appeared in Riesi, Butera (Caltanissetta province), and Messina (Vallese, 1895; Galet, 1988).

Agronomical and botanical research led to the identification of grapevines from across the Atlantic Ocean as the solution for rescuing viticulture from a catastrophic epilogue: their root system, unlike Euro-Mediterranean *V. vinifera* L., is immune from phylloxera, thus their employment as grafted rootstocks for *V. vinifera* cultivars (known as “vitigni” and “vignes”) proved to be a key strategy.

North American species like *V. riparia* Michx. and *V. rupestris* Scheele represented the earliest choice for obtaining phylloxera-resistant rootstocks, replaced in subsequent years by artificial interspecific hybrids more adapted to satisfy particular requirements of soil (texture, pH, moisture) and grafting affinity. Crossing experiments took place mainly in France, however, at the beginning of the 20th century, Sicily became as well one of the most prolific experimental centers for the production of hybridogenic rootstocks, thanks to the activity of Antonio Ruggeri (1895-1915) and Federico Paulsen (1861-1943), Italian agronomists who obtained many of the *V. berlandieri* Planch. × *V. rupestris* rootstocks currently employed world-wide, e.g. ‘775 P’, ‘779 P’, ‘1103 P’, and ‘140 Ru’ (Galet, 1988; Eynard & Dalmasso, 1990).

Despite Sicily’s role in viticulture history, the occurrence of spontaneous alien *Vitis* taxa across its territory appears to have been less investigated than other areas such as Spain (Laguna, 2003, 2004), Italian peninsula, Elba island (Ardenghi et al., 2014, 2015a, 2015b), and France (Tison & de Foucault, 2014). The examination of recent floristic sources regarding Sicily (Conti et al.,

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2005; Raimondo et al., 2005a, 2005b; Giardina et al., 2007; Celesti-Grapow et al., 2009, 2010; Raimondo & Spadaro, 2009; Raimondo et al., 2010; Ardenghi et al., 2014) reveals that only three species are known as casual or naturalized from this region (V. labrusca L., V. riparia, and V. rupestris), without any reference to hybrids.

Aim of this paper is to improve and update the geographical distribution and the invasion status of the non-native Vitis taxa occurring in Sicily, providing useful information for the whole Euro-Mediterranean area, in view of the new treatment of the family Vitaceae within the Euro+Med Plantbase Project (Ardenghi, Banfi & Galasso, in prep.; Euro+Med, 2006 onwards).

MATERIALS AND METHODS

The current paper is based on the study of material collected during field trips in Sicily (Italy) in June 2015; the specimens are currently stored at the Museo di Storia Naturale di Milano Herbarium (MSNM; herbaria acronyms according to Thiers, 2014 onwards). Further exsiccata from this region held at CAT (already published by Ardenghi et al., 2014) and the private herbarium of Adriano Soldano (Vercelli) have been examined.

For each treated taxon we list: the currently accepted name, reasons for its recording (e.g., floristic novelty, invasion status modified), regional distribution, habitat, invasion status (according to the definitions provided by Celesti-Grapow et al., 2009), information on its use in Sicily (acquired from: Falci, 1914; Rossi, 1955; Galet, 1988; Eynard & Dalmasso, 1990; Bica, 2007; Ministero delle Politiche Agricole, Alimentari e Forestali, 2015), comments (“notes”), examined herbarium material (“specimen visa”), and localities recorded only in the field. Herbarium and field records were employed to elaborate the distribution maps (Figs. 1-2).

RESULTS AND DISCUSSION

Vitis berlandieri Planch., Compt. Rend. Hebd. Séances Acad. Sci, 91: 425(-428). 1880.

Neophyte excluded from the flora of Sicily.

Notes. The record of V. berlandieri by Giardina et al. (2007), subsequently repeated by Raimondo et al. (2010), besides referring only to residuals of cultivation, is doubtful and has to be referred to either V. ×koberi or V. ×ruggerii: as already pointed out by Ardenghi et al. (2014) on the basis of viticulture sources (e.g., Galet, 1988; Eynard & Dalmasso, 1990), pure V. berlandieri has never been employed as rootstock, being impossible its reproduction from cuttings. Thus, the presence of this species both in the wild and in cultivation is improbable.

Vitis ×goliath Ardenghi, Galasso & Banfi, Phytotaxa, 224 (3): 241. 2015.

(= V. riparia Michx. × V. rupestris Scheele × V. vinifera L.)

New neophyte to the flora of Sicily.

Distribution. Rare, recorded from only two localities in the provinces of Catania and Messina (Fig. 1).

Habitat. Waste land, walls; 89-371 m.

Invasion status. Naturalized.

Use. In Sicily, as in other parts of Italy, this complex hybrid is exclusively employed as rootstock. A single cultivar is officially planted, ‘Golia’, obtained by Italian agronomists at the beginning of the 20th century. Vigorous and well-adapted to compact and calcareous soils, it has

![Fig. 1 - Geographical distribution in Sicily of Vitis rupestris (red dots), Vitis ×goliath (green dots), and Vitis ×ruggerii (blue dots).](image-url)
been introduced in Sicily around the 1950’s (Rossi, 1955; Galet, 1988; Eynard & Dalmasso, 1990; Ardenghi et al., 2015a).

Notes. Unlike other populations from Italy (Ardenghi et al., 2015a), no flower and fruit production has been observed.

Specimina visa
ITALY. Sicily. Prov. Catania: Acireale, Santa Maria delle Grazie, via Nazionale per Catania, lato E, tra via delle Palme e via Volano (UTM WGS84: 33S 514705.4160205), 89 m, no exp., incolto con *Olea europaea*, *Daucus carota*, *Verbascum sinuatum*, 12.06.2015, N. Ardenghi & P. Cauzzi 95 (MSNM).

Specimina visa
ITALY. Sicily. Prov. Messina: Ficarra, SP145, lato SW, San Mauro (UTM WGS84: 33S 484174.4218817), 371 m, NE, sommità di parete in cemento, 12.06.2015, N. Ardenghi & P. Cauzzi 79 (MSNM).

*Vitis ×instabilis* Ardenghi, Galasso, Banfi & Lastrucci, *Phytotaxa*, 166 (3): 182. 2014. (= *V. riparia* Michx. × *V. rupestris* Scheele)

New neophyte to the flora of Sicily.

Distribution. Rather rare, concentrated in the northern and north-western parts of the region; recorded from the provinces of Catania, Messina, and Palermo (Fig. 2).

Habitat. Roadsides, waste land, walls, fences, often associated with nitrophilous perennial vegetation (*Bromo-Oryzopsis miliaceae* O.Bolós 1970) and Mediterranean shrub communities with *Rubus* sp. pl.; 4-411 m.

Invasion status. Invasive. Almost monospecific stands, covering the surrounding vegetation, have been recorded mainly along roadsides. The spread of this nothotaxon, already ascertained as invasive for the Italian peninsula (Ardenghi et al., 2014), might be enhanced by the production of fruits (recorded from most of the populations), nearly ripe already at the beginning of June in the study area.

Use. Despite its high resistance to phylloxera, vigor and easy reproduction from cuttings, *V. ×instabilis* rootstocks are susceptible to drought and displays low affinity in grafting with Sicilian *V. vinifera* cultivars, deficiencies which limited their diffusion in this region and across the Mediterranean area, especially during the second half of the 20th century (Rossi, 1955; Galet, 1988; Eynard & Dalmasso, 1990; Ardenghi et al., 2014).

Specimina visa
ITALY. Sicily. Prov. Messina: Tusa, Castel di Tusa, SS113, lato S, ca. 100 m a W da via Tusa (UTM WGS84: 33S 434016.4207085), 34 m, N, recinzione di incolto con *Asparagus acutifolius* e *Rubia peregrina*, 11.06.2015, N. Ardenghi & P. Cauzzi 74 (MSNM); Ficarra, SP145, lato NE, San Mauro (UTM WGS84: 33S 484231.4218761), 372 m, NE, scarpata stradale con *Rubus* cfr. *ulmifolius*, *Oloptum thomasi* e *Foeniculum vulgare*, 12.06.2015, N. Ardenghi & P. Cauzzi 78 (MSNM); Ficarra, SP145, lato E, tra l’abitato di Ficarra e Martini di Sinagra (UTM WGS84: 33S 485587.4217222), 411 m, SW, scarpata a ridosso della strada con *Olea europaea*, *Opuntia ficus-indica*, *Smyrnium olusatrum*, 12.06.2015, N. Ardenghi & P. Cauzzi 86 (MSNM).

Specimina visa
ITALY. Sicily. Prov. Palermo: Lascari, via Piane Nuove, lato N (UTM WGS84: 33S 404726.4207061), 4 m, no exp., ciglio e sponda di canale con *Equisetum ra-
mosissimum, Oloptum thomasii, Arundo donax, Daucus carota, Rubus cfr. ulmifolius, 11.06.2015, N. Ardenghi & P. Cauzzi 71 (MSN).  

Localities recorded only in the field  
ITALY. Sicily. Prov. Catania: Cannizzaro, via Nazionale, ca. 150 m E da via Stazzone (UTM WGS84: 33S 511067.4219869), 10 m, no exp., recinzione, 13.06.2015, N. Ardenghi & P. Cauzzi.  
Prov. Messina: Terme Vigliatore, Vigliatore, A20 Messina-Palermo, direzione Messina, lato S, all’altezza di via Giovanni Gronchi (UTM WGS84: 33S 3522104.4225952), 44 m, NE, recinzione di confine con sterrata tra gli uliveti, tappezzante questa e gli ulivi, con Oloptum miliaceum, Avena sterilis e Parietaria judaica, 12.06.2015, N. Ardenghi & P. Cauzzi.  

Vitis ×koberi Ardenghi, Galasso, Banfi & Lastrucci, Phytotaxa, 166 (3): 184. 2014.  
(= V. berlandieri Planch. × V. riparia Michx.)  
Neophyte confirmed to the flora of Sicily.  

Distribution. Rather widespread, especially in the northern and north-western parts of the region; already reported from the Sicani Mountains (Domina et. al., 2015), it is here recorded from the provinces of Caltanissetta, Catania, Messina, and Palermo (Fig. 2).  

Habitat. Roadsides, railway embankments, olive groves, waste land, often associated with nitrophilous perennial vegetation (Bromo-Oryzopsis miliaceae O.Bolós 1970) and Mediterranean shrub communities with Rubus sp. pl.; 10-456 m.  

Invasion status. Invasive. In the majority of the recorded sites, V. ×koberi, the most invasive alien Vitis in Italy along with V. ×instabilis (Ardenghi et al., 2014), forms monospecific stands, covering the surrounding vegetation and buildings (Fig. 3). Fruit production is frequent.  

Use. Some of the most appreciated rootstocks employed in Sicily belong to V. ×koberi, well-adapted to drought and usually to limestone-based soils. However, since the second half of the 20th century, their use decreased on behalf of V. ×ruggerii cultivars (Rossi, 1955; Istituto centrale di statistica & Ministero dell’agricoltura e delle foreste, 1972).  

Specimina visa  
ITALY. Sicily. Prov. Caltanissetta: Sutera, ex stazione FS di Sutera (UTM WGS84: 33S 384717.4154768), 185 m, E, massicciata ferroviaria con sparsi esemplari di Robinia pseudoacacia, interno di edificio abbandonato e muro esterno incolto adiacente con Phragmites australis, 10.06.2015, N. Ardenghi & P. Cauzzi 45 (MSN).  
Prov. Palermo: Castronovo di Sicilia, SP189, lato S, all’altezza del Piano dei Mercanti (UTM WGS84: 33S 379325.4174833), 456 m, no exp., margine di uliveto, con Acanthus mollis e Avena sterilis, 10.06.2015, N. Ardenghi & P. Cauzzi 50 (MSN); Mezzojuso, lato NW, Contrada Farra, presso Maragliano (UTM WGS84: 33S 368527.4191338), 311 m, no exp., recinzione con Scolymus hispanicus, 10.06.2015, N. Ardenghi & P. Cauzzi 52 (MSN); Termini Imerese, SS113, curva a N del ponte sul Fosso San Leonardo, a lato dell’ex edificio ferroviario (UTM WGS84: 33S 384275.4205739),

**Fig. 3 - Vitis ×koberi in Sutera: a) invasive stand along the railway; b) leaf blades (Photos: N.M.G. Ardenghi).**
10 m. E, guard rail and scarpata stradale con Arundo donax e Parietaria judaica, 11.06.2015, N. Ardenghi & P. Cauzzi 68 (MSNM).

Localities recorded only in the field
ITALY. Sicily. Prov. Catania: Giarre, A18 Messina-Catania, raccordo con la SP44 (UTM WGS84: 33S 514644.4172984), 196 m, no exp., arbusteti e alberi a bordo strada, 12.06.2015, N. Ardenghi & P. Cauzzi; Santa Venerina, A18 Messina-Catania, lato S del cavalcavia di via Pizzo (UTM WGS84: 33S 514154.4170748), 223 m, no exp., scarpata a ridosso della strada, 12.06.2015, N. Ardenghi & P. Cauzzi; Acireale, A18 Messina-Catania, lato N del cavalcavia di via Cefalù (UTM WGS84: 33S 512209.4163809), 12.06.2015, 269 m, no exp., scarpata a ridosso della strada, N. Ardenghi & P. Cauzzi. Prov. Messina: Caronia, SS113, lato SW, ca. all’altezza della Galleria Portale (A20) (UTM WGS84: 33S 447999.420846), 32 m, NE, scarpata alla base di un uliveto, con Pistacia terebinthus e Ampelodesmos mauritanicus, 11.06.2015, N. Ardenghi & P. Cauzzi; Capo d’Ordano, SS113, lato E, Piscittina (UTM WGS84: 33S 475622.4219136), 37 m, N, parete rocciosa a ridosso della strada, 11.06.2015, N. Ardenghi & P. Cauzzi; Pace del Mela, A20 Messina-Palermo, ponte sul Torrente Muto, lato interno dell’autostrada (UTM WGS84: 33S 528287.4227885), 19 m, no exp., guard rail, 12.06.2015, N. Ardenghi & P. Cauzzi.

Vitis labrusca L., Sp. Pl., 1: 203. 1753.

Presence in Sicily confirmed; invasive status changed from casual to naturalized for Sicily. Distribution. Rare, recorded from only two localities in the province of Messina (Fig. 2).

Habitat. Riverbanks, waste land; 120-411 m.

Invasion status. Naturalized. The populations observed in the province of Messina (especially along the banks of the Naso stream in Sinagra) are well-established, reproducing both vegetatively and by seed as in Lombardy, the only Italian region where V. labrusca has ever been recorded as naturalized (Ardenghi, 2010; Ardenghi et al., 2014).

Use. Cultivated almost exclusively for fruit consumption, occasionally for domestic wine-making, mostly in private vegetable gardens. The commercial cultivation of V. labrusca in Sicily, formerly concentrated in the province of Messina, seems in decline (Istituto centrale di statistica & Ministero dell’agricoltura e delle foreste, 1972).

Notes. The species was already reported from Sicily by Giardina & Conti et al. (2007; Celestii-Grapoew et al., 2009, 2010; Provincia Regionale di Palermo, 2009; Raimondo et al., 2010; Ardenghi et al., 2014), however, as noticed by G. Galasso (in Conti et al., 2005: 417), literature data may refer to other non-native taxa, such as the record by Giardina et al. (2007) (then repeated by Raimondo et al., 2010), indicating V. labrusca as “cultivated as rootstock for V. vinifera and surviving up to 150 years”: this species has never been used in viticulture as rootstock (see e.g., Galet, 1988; Eynard & Dalmasso, 1990; Ardenghi et al., 2015b), therefore this record, besides not being referable to wild populations (but only to residuals of cultivation), has to be assigned to other species or nothospecies.

Specimina visa
ITALY. Sicily. Prov. Messina: Ficarra, SP145, lato E, tra l’abitato di Ficarra e Martini di Sinagra (UTM WGS84: 33S 485587.421722), 411 m, SW, scarpata a ridosso della strada con Olea europaea, Opuntia ficus-indica, Foeniculum vulgare, Arundo donax, Artemisia arborescens, 12.06.2015, N. Ardenghi & P. Cauzzi 82 (MSNM).

Localities recorded only in the field
ITALY. Sicily. Prov. Messina: Sinagra, Mulinozzo, sinistra idrografica del Torrente Naso, SP14bis, lato NE (UTM WGS84: 33S 484138.4217146), 120 m, NE, scarpata a ridosso del fiume con Rubus cfr. ulmifolius, 12.06.2015, N. Ardenghi & P. Cauzzi.

Vitis riparia Michx., Fl. Bor.-Amer., 2: 231. 1803.

Neophyte doubtfully present in Sicily. Notes. Literature data regarding the presence of V. riparia in Sicily (Conti et al., 2005; Celestii-Grapoew et al., 2009, 2010; Ardenghi et al., 2014) may actually refer to either V. ×instabilis (especially to the riparia-like cultivar ‘101-14 Mgt’) or V. ×koberi, both morphologically reminiscent of V. riparia. The species was not recorded during our field surveys. Employed mainly during the early stages of the phylloxera invasion, it appears to be less common than thought in the past: many previous Italian literature data have recently been referred to its hybrids (see Ardenghi et al., 2014) and its occurrence seems mostly limited to riverine habitats.

Vitis ×ruggerii Ardenghi, Galasso, Banfi & Lustrucci, Phytotaxa, 166 (3): 187. 2014.

(= V. berlandieri Planch. × V. rupestris Scheele) Neophyte new to the flora of Sicily. Invasion status changed from naturalized to invasive for Italy and Europe. Distribution. Widespread, especially in the southern part of the region; recorded from the provinces of Agrigento, Caltanissetta, Messina, Palermo, and Ragusa (Fig. 1).

Habitat. Roadsides, olive groves, waste land, fences, walls, ditch embankments, often associated with ruderal perennial vegetation (Bromo-Oryzopsis miliaceae walls, ditch embankments, often associated with ruderal perennial vegetation (Bromo-Oryzopsis miliaceae). Invasion status. Invasive. Similarly to V. riparia, this nothospecies reproduces only vegetatively, being provided only with male flowers (see Ardenghi et al., 2015a); it commonly forms extended and dense monospecific stands, with covers reaching 100%, concealing spontaneous vegetation, edges of cultivations, roadsides, and buildings (Fig. 4), particularly along the southern coast.

Use. Rootstocks of V. ×ruggerii are at the base of modern Sicilian viticulture. Internationally renowned and economically valuable V. vinifera cultivars grown in Sicily for wine-making, such as ‘Calabrese’ (syn. ‘Nero d’Avola’), ‘Zibibbo’, ‘Ansonica’ (syn. ‘Inzolia’ or ‘Insolia’), ‘Catarratto Bianco comune’, and ‘Nerello Mascalese’, are grafted almost exclusively on this nothotaxon (Bica, 2007; Ministero delle Politiche Agricole, Alimentari e Forestali, 2015), which is additionally used as rootstock for
table grape cultivars (Regione Siciliana, 2014) (Fig. 5). *V. ×ruggerii* rootstocks began to be used in vineyards of southern Europe and North Africa after 1920, welcomed for their resistance to drought and limestone, high vigor, and grafting affinity with *V. vinifera* (Galet, 1988).

**Notes.** Two specimens collected in Acate and Calamonnaci (collection numbers 04 and 33) belong to the cultivar ‘57 R’, characterized by 3- to slightly 5-lobed leaf blades. It can be easily distinguished from individuals of *V. ×koberi* with lobed leaves (originating from cultivar ‘420 A’) for some typical *V. rupestris* features, such as the longitudinally folded leaf blades and their reniform shape, the largely U-shaped basal sinus, and the bright red color of petioles and nerves on the adaxial leaf surface (Fig. 6). This rootstock, whose ability to produce fruits is controversial (see Galet, 1988, and Cosmo et al., 1958), has never been recorded before in the wild; due to incompatibility in grafting, its use has been almost abandoned (Galet, 1988; Ministero delle Politiche Agricole, Alimentari e Forestali, 2015).

*V. ×ruggerii*, up to now recorded only from Spain, Italy, and France (Laguna, 2004; Ardenghi et al., 2014; Tison & de Foucault, 2014), has recently been collected by the authors in Crete, where it can be considered naturalized; this is the first record for Greece (Lazarakis, 2005).

**Specimina visa**

**ITALY. Sicily. Prov. Agrigento:** Palma di Montechiaro, Contrada Zimmeli, lato S, pochi m a E dall’incrocio con la SP64, all’altezza della “Coop. Agricola Chiaramonte” (UTM UTM WGS84: 33S 386635.4117821), 168 m, N, ciglio stradale alla base di scarpata, con *Dittrichia viscosa, Daucus carota, Foeniculum vulgare, Lathyrus odoratus, Capparis spinosa, Carduus pycnocephalus*, 08.06.2015, N. Ardenghi & P. Cauzzi 17 (MSNM); Calamonnaci, serrattra tra la SP32 e il Torrente Maurici (UTM WGS84: 33S 354327.4151203), 165 m, no exp., uliveto sarchiato, 09.06.2015, N. Ardenghi, P. Cauzzi & V. Ruvolo 33 (MSNM). **Prov. Caltanissetta:** Gela, SS115, a E di via Barbabianca, ponte sul Torrente Gattano, lato N (UTM WGS84: 33S 429507.4104523), 10 m, no exp., sponda di torrente e ciglio stradale con *Foeniculum vulgare, Avena barbata, Morus alba*, 08.06.2015, N. Ardenghi & P. Cauzzi 08 (MSNM); Butera, pendici SE del Pizzo Marcato Bianco, SP48, lato E dell’incrocio con la SP71 (UTM WGS84: 33S 415059.4113658), 257 m, W, margine di serrattra con *Oloptum miliaceum, Carduus pycnocephalus, Convolvulus arvensis, Ricinus communis, muri in mattoni di vecchi edifici agricoli, 08.06.2015, N. Ardenghi & P. Cauzzi 10 (MSNM). **Prov. Messina:** Sinagra, Pianomonaci, sinastra idrografica del Torrente Naso, SP14bis, lato NE (UTM WGS84: 33S 485006.4216490), 148 m, NE, ciglio stradale con *Acanthus mollis, Foeniculum vulgare, Rubus cfr. ulmifolius, Arundo donax*, 12.06.2015, N. Ardenghi & P.
Cauzzi 84 (MSNM); Milazzo, A20 Messina-Palermo, la
to SE dell’area di servizio Olivarella sud (UTM WGS84:
33S 522104.4225952), 44 m, NE, recinzione di confine
collateralmente con gli uliveti, tappezzante questa e gli ulivi,
con Oloptum miliaceum, Avena sterilis e Parietaria ju
daica, 12.06.2015, N. Ardenghi & P. Cauzzi 90 (MSNM).

Prov. Palermo: Castronovo di Sicilia, SP189, lato N, tra
il Motel San Pietro e l’incrocio con SP79 (UTM WGS84:
33S 381137.4169930), 384 m, S, recinzione in plastica e
siepe di oleandro, 10.06.2015, N. Ardenghi & P. Cauzzi 49
(MSNM); Mezzojuso, SP82, lato N, ca. 300 m a W dall’in
crocio con la SP55 (UTM WGS84: 33S 365609.4187681),
772 m, S, recinzione di uliveto, 10.06.2015, N. Ardenghi
& P. Cauzzi 57 (MSNM); Campofelice di Roccella, Piana
Calzata, viale S. Francesco, lato SE (UTM WGS84: 33S
403271.4206397), 5 m, NW, massicciata ferroviaria con
Oloptum thomasii, Rubus cfr. ulmifolius, Arundo donax,
11.06.2015, N. Ardenghi & P. Cauzzi 69 (MSNM).

Prov. Ragusa: Vittoria, SP103, lato S, Villaggio Porte Rosse, la
to W della rotonda con la Stradale per Scoglitti/Contrada
Lucarella (SP17), (UTM WGS84: 33S 450899.4086412),
88 m, N, ciglio con Dasyphyllum villosum, 08.06.2015, N.
Ardenghi & P. Cauzzi 01 (MSNM); Vittoria, Borgo Alcer
to, SP31, lato W (UTM WGS84: 33S 447624.4088213),
41 m, no exp., ciglio con discarica abusiva di scarti vege
tali, assieme a Oloptum miliaceum e Avena byzantina,
arraimpicantesi anche sugli eucalipti adiacenti, 08.06.2015,
N. Ardenghi & P. Cauzzi 02 (MSNM); Acate, Contrada
Pezza di Fico (SR26), a NE di Marina di Acate (UTM
WGS84: 33S 443639.4093858), 12 m, NE, recinzione,
08.06.2015, N. Ardenghi & P. Cauzzi 03 (MSNM); Acate,
Contrada Pezza di Fico (SR26), a NE di Marina di Acate
(UTM WGS84: 33S 443639.4093858), 12 m, NE, recinzione,
o8.06.2015, N. Ardenghi & P. Cauzzi 04 (MSNM); Acate,
Contrada Pezzalistingo, lato N (UTM WGS84: 33S
446390.4094401), 60 m, S, recinzione e margine di
uliveto con Arundo donax, arrampicata anche su un man
dorlo, 08.06.2015, N. Ardenghi & P. Cauzzi 05 (MSNM);
Acate, rotonda tra la SP194 e la SP51 (UTM WGS84: 33S
444048.4096269), 15 m, no exp., marciapiede e interno di
rotonda in parte bruciato con madonnina, assieme a Dit
trichia viscosa, 08.06.2015, N. Ardenghi & P. Cauzzi 06
(MSNM).

GREECE. Crete. Nomos of Chania: Eparchia of
Chania, unsurfaced road on the E side of Sykolia (UTM
WGS84: 35°29′27.0″N, 23°58′31.2″E), 34 m, no exp.,
Rubus sp. scrub with Vitis vinifera, Sorghum halepense
and Oloptum miliaceum, between a citrus orchard and a
former olive grove, 15.06.2014, N. Ardenghi & P. Cauzzi
s.n. (MSNM).

Localities recorded only in the field
ITALY. Sicily. Prov. Agrigento: Licata, SP62, ca.
600 m a SW dal confine con Butera (Caltanissetta) (UTM
WGS84: 33S 414110.4110612), 276 m, no exp., ciglio
stradale e rete in filo spinato, 08.06.2015, N. Ardenghi & P. Cauzzi; Palma di Montechiari, Ciotta, a NE dell’abitato, Contrada Ciotta (UTM WGS84: 33S 395314.4112356), 52 m, no exp., ciglio stradale, 08.06.2015, N. Ardenghi & P. Cauzzi; Palma di Montechiari, Ciotta, abitato, Contrada Ciotta, a W dell’incrocio con via Mare dei Coralli (UTM WGS84: 33S 394717.4111816), 47 m, no exp., cigli stradali, 08.06.2015, N. Ardenghi & P. Cauzzi; Palma di Montechiari, sinistra idrografica del fiume Palma, strada tra Ciotta e Fumaloro/Marina di Palma (UTM WGS84: 33S 390755.4113437), 84 m, S, muro di sostegno lungo la strada e uliveto, 08.06.2015, N. Ardenghi & P. Cauzzi; Favara, SS115 tra gli incroci con la Strada Statale di Furore (SS576) e l’ex pista atterraggio di Misilina, sopra Cipolluzze di Agrigento (UTM WGS84: 33S 385692.4114918), 47 m, S, muro in pietra, 08.06.2015, N. Ardenghi & P. Cauzzi; Favara, SS115 tra gli incroci con la Strada Statale di Furore (SS576) e l’ex pista atterraggio di Misilina, sopra Cipolluzze di Agrigento (UTM WGS84: 33S 382095.4122828), 63 m, no exp., scarpata a ridosso della strada, 08.06.2015, N. Ardenghi & P. Cauzzi; Agrigento, via Madonna della Rocca (UTM WGS84: 33S 382307.4122501), 67 m, no exp., recinzione di ulive-
ALIEN GRAPES (VITIS, VITACEAE) IN SICILY (ITALY): NOVELTIES FOR THE SICILIAN AND MEDITERRANEAN FLORA

Vitis rupestris Scheele, Linnaea, 21 (5): 591. 1848.

Invasive status changed from naturalized to invasive for Sicily, Italy, and Europe.

Distribution. Rather widespread, recorded from the provinces of Agrigento, Catania, Messina, Palermo, Ragusa, and Siracusa. Prior to our records, the species was known only from two localities in the provinces of Messina and Ragusa (Ardenghi et al., 2014) (Fig. 1).

Habitat. Roadsides and waste land, walls, fences, often associated with nitrophilous perennial vegetation (Bromo-Oryzopson miliaeae O.Bolòs 1970) and Mediterranean shrub communities with Rubus sp. pl.; 8-931 m.

Invasion status. Invasive. Despite spreading only vegetatively [Sicilian populations, as already observed by Ardenghi et al. (2015a) for the whole Italian territory, are provided only with male flowers], V. rupestris has been noticed to form almost monospecific stands extending for hundreds of meters in length, with covers reaching almost 100%, especially in the Sicani Mountains area (Fig. 7).

Use. Pure V. rupestris has been one of the first rootstocks to be employed at the beginning of the phylloxera crisis, its root system being highly resistant to the insect and adapted to well-drained and even saline soils. Different cultivars were used in Sicily, among them ‘du
Lot’ (locally known also under the erroneous vernacular names “Monticola” or “Munticola”, which actually refer to a different species, *V. monticola* Buckley, endemic to Texas: see Moore, 1991), ‘Ganzin’, and ‘Martin’ (all male clones). However, general susceptibility to drought and excessive vigor (causing straggling clusters and late-ripening in grafted *V. vinifera*) led to its abandonment on behalf of other hybrids (Falci, 1914; Rossi, 1955; Istituto centrale di statistica & Ministero dell’agricoltura e delle foreste, 1972; Galet, 1988; Eynard & Dalmasso, 1990; Bica, 2007).

**Specimina visa**

ITALY. Sicily. Prov. Agrigento: Palma di Montechiaro, Marina di Palma, SP84, lato NE, a SW dell’incrocio con via degli Ulivi (UTM WGS84: 33S 388521.411512), 71 m, SW, sommità di muro in cemento, con *Pistacia lentiscus* e *Salsola oppositifolia*, 08.06.2015, N. Ardenghi & P. Cauzzi 16 (MSNM); Ribera, SP61, lato W, ca. 330 m a S dall’incrocio con la SP33 e la Strada ex Consortile n. 18, davanti all’autocarrozzeria Mulè (UTM WGS84: 33S 347281.4150209), 197 m, E, scarpata con *Eucalyptus* sp., *Oloptum miliaceum*, *Dittrichia viscosa*, *Avena sterilis*, 09.06.2015, N. Ardenghi & P. Cauzzi 16 (MSNM); Ribera, SP32, lato N, pendici S del Cozzo di Schiavo (UTM WGS84: 33S 348647.4150264), 100 m, S, ciglio stradale e recinzione di uliveto, 09.06.2015, N. Ardenghi, P. Cauzzi & V. Ruvolo 36 (MSNM).

Prov. Messina: Salina, Timpone Rosso, 14.05.1970, S. Brullo s.n. (CAT-029787 sub *V. vinifera*); Tusa, SS113, lato N, all’incirca all’altezza del Casello FS (UTM WGS84: 33S 432190.420717), 35 m, N, scarpata stradale con Silene vulgaris e Boerhavia coccinea, 11.06.2015, N. Ardenghi & P. Cauzzi 73 (MSNM); Ficarra, SP145, lato E, tra l’abitato di Ficarra e Martini di Sinagra (UTM WGS84: 33S 485587.4217222), 411 m, SW, scarpata a ridosso della strada con *Olea europaea*, Opuntia ficus-indica, *Foeniculum vulgare*, Arundo collina, Artemisia arborescens, 12.06.2015, N. Ardenghi & P. Cauzzi 81 (MSNM). **Prov. Palermo**: Campofelice di Fitalia, strada tra Vallone Sordo e Masseria Fitalia (UTM WGS84: 33S 367070.4187979), scarpata e recinzione a ridosso di uliveto, con *Vitis vinifera*, 639 m, no exp., 10.06.2015, N. Ardenghi & P. Cauzzi 53 (MSNM); Mezzojuso, SP82, lato S, ca. 300 m a W dall’incrocio con la SP55 (UTM WGS84: 33S 365609.4187681), 772 m, N, scarpata con Rubus sp., 10.06.2015, N. Ardenghi & P. Cauzzi 56 (MSNM).

Prov. Ragusa: Pantano Longarini (Pozzallo), 25.04.1969, S. Brullo s.n. (CAT-029788 sub *V. vinifera*).

Prov. Siracusa: Siracusa, dal ponte sul T. Cassabile verso il bivio per Fontanebianche, 08.2009, A. Soldano s.n. (Herb. A. Soldano-14345).

Localities recorded only in the field

ITALY. Sicily. Prov. Catania: Cannizzaro, via Nazionale, ca. 150 m a E da via Stazzone (UTM WGS84: 33S 511897.4155385), 38 m, no exp., sommità di muro lungho la strada, 13.06.2015, N. Ardenghi & P. Cauzzi. **Prov. Messina**: Caronia, SS113, lato E del ponte sul Torrente Caronia (UTM WGS84: 33S 449898.4209637), 23 m, no exp., scarpata stradale, 11.06.2015, N. Ardenghi & P. Cauzzi. **Prov. Palermo**: Campofelice di Fitalia, viale Alcide de Gasperi, lato N, a SE dell’abitato (UTM WGS84: 33S 367265.4175000), 712 m, N, roveto e pali della luce adiacenti, 10.06.2015, N. Ardenghi & P. Cauzzi. **Prov. Messina**: Salina, Timpone Rosso, 14.05.1970, S. Brullo s.n. (CAT-029787 sub *V. vinifera*); Tusa, SS113, lato N, all’incirca all’altezza del Casello FS (UTM WGS84: 33S 432190.420717), 35 m, N, scarpata stradale con Silene vulgaris e Boerhavia coccinea, 11.06.2015, N. Ardenghi & P. Cauzzi 73 (MSNM); Ficarra, SP145, lato E, tra l’abitato di Ficarra e Martini di Sinagra (UTM WGS84: 33S 485587.4217222), 411 m, SW, scarpata a ridosso della strada con *Olea europaea*, Opuntia ficus-indica, *Foeniculum vulgare*, Arundo collina, Artemisia arborescens, 12.06.2015, N. Ardenghi & P. Cauzzi 81 (MSNM). **Prov. Palermo**: Campofelice di Fitalia, strada tra Vallone Sordo e Masseria Fitalia (UTM WGS84: 33S 367070.4187979), scarpata e recinzione a ridosso di uliveto, con *Vitis vinifera*, 639 m, no exp., 10.06.2015, N. Ardenghi & P. Cauzzi 53 (MSNM); Mezzojuso, SP82, lato S, ca. 300 m a W dall’incrocio con la SP55 (UTM WGS84: 33S 365609.4187681), 772 m, N, scarpata con Rubus sp., 10.06.2015, N. Ardenghi & P. Cauzzi 56 (MSNM). **Prov. Ragusa**: Pantano Longarini (Pozzallo), 25.04.1969, S. Brullo s.n. (CAT-029788 sub *V. vinifera*).

**Fig. 7 - Vitis rupestris**: a) invasive monospecific stand in Mezzojuso; b) leaf blades (Photos: N.M.G. Ardenghi).
WGS84: 33S 362482.4176430), 8 m, SE, recinzione con Rubus sp., 11.06.2015, N. Ardenghi & P. Cauzzi.

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REFERENCES
Ardenghi N.M.G., 2010 – Notulae 8–21. In: Notulae ad plantas advenas longobardiae spectantes: 1 (1-28). Galasso G. & Banfi E. (eds.). Pagine Botaniche, Milano, 34: 22-30.

Ardenghi N.M.G., Galasso G., Banfi E., Zoccola A., Foggi B. & Lastrucci L., 2014 – A taxonomic survey of the genus Vitis L. (Vitaceae) in Italy, with special reference to Elba Island (Tuscan Archipelago). Phytotaxa, 166 (3): 163-198.

Ardenghi N.M.G., Banfi E. & Galasso G., 2015a – A taxonomic survey of the genus Vitis L. (Vitaceae) in Italy, part II: the ‘Euro-American’ hybrids. Phytotaxa, 224 (3): 232-246.

Ardenghi N.M.G., Galasso G., Banfi E. & Cauzzi P., 2015b – Vitis ×novae-angliae (Vitaceae): systematics, distribution and history of an “illegal” alien grape in Europe. Willdenowia, 45 (2): 197-207.

Bica D., 2007 – Vitigni di Sicilia. Regione Siciliana, Assessorato Agricoltura e Foreste Servizi allo Sviluppo, Palermo.

Celesti-Grapow L., Pretto F., Brundu G., Carli E. & Blasi C. (eds.), 2009 – A thematic contribution to the National Biodiversity Strategy. Plant invasion in Italy, an overview. Ministry for the Environment Land and Sea Protection, Nature Protection Directorate, Roma: 1-32 + Cd-Rom.

Celesti-Grapow L., Pretto F., Carli E. & Blasi C. (eds.), 2010 – Flora vascolare alloctona e invasiva delle regioni d’Italia. Casa Editrice Università La Sapienza, Roma.

Conti F., Abbate G., Alessandrini A. & Blasi C. (eds.), 2005 – An Annotated Checklist of the Italian Vascular Flora. Palombi Editori, Roma.

Cosmo I., Comuzzi A. & Polsinelli M., 1958 – Portinnesti della vite. Edizioni Agricole, Bologna.

Domina G., Marino P., Castellano G., Amato F., Cambria S., Cancellieri L., Crisafulli A., Cristaudo A., Faraoni F., Galesi R., Guarino R., Lattanzi E., Lavezzo P., Longo D., Maiorca G., Peccenini S., Perrino E.V., Salerno G., Scolastri A., Soldano A., Stinca A., Wagensomer R.P., Xibilia L., Raimondo F.M., 2015 – Contributo ala conoscenza floristica dei monti Sicani (Sicilia): resoconto dell’escursione del Gruppo di Floristica (S.B.I.) nel 2012. Informatore Botanico Italiano [in press].

Euro+Med, 2006 onwards – Euro+Med Plantbase - the information resource for Euro-Mediterranean plant diversity. <http://ww2.bgbm.org/EuroPlusMed/> (retrieved on 3rd September 2015).

Eynard I. & Dalmasso G., 1990 – Viticoltura moderna: manuale pratico. Hoepli, Milano.

Falcì R., 1914 – Piante coltivate in Sicilia. Stab. Tip. Priulla, Palermo.

Galet P., 1988 – Cépages et vignobles de France. Tome 1: Les vignes américaines. Déhan, Montpellier.

Giardina G., Raimondo F.M. & Spadaro V., 2007 – A catalogue of plants growing in Sicily. Bocconea, 20: 5-582.

Istituto centrale di statistica & Ministero dell’agricoltura e delle foreste, 1972 – Catasto viticolo (rilevazione al 25 ottobre 1970) 1(1). Failli, Roma.

Laguna E., 2003 – Sobre las formas naturalizadas de Vitis L. (Vitaceae) en la Comunidad Valenciana, I. Especies. Flora Montiberica, 23: 46-82.

Laguna E., 2004 – Datos foliares de la especies e híbridos alóctonos de vides (género Vitis) en el territorio valenciano. Toll Negre, 3: 11-25.

Lazarakis K., 2005 – The Wines of Greece. Mitchell Beazley, London.

Ministero delle Politiche Agricole, Alimentari e Forestali, 2015 – Registro nazionale delle varietà di vite. <http://catalogoviti.politicheagricole.it/home.php> (retrieved on 3rd September 2015).

Moore M.O., 1991 – Classification and systematics of eastern North American Vitis L. (Vitaceae) North of Mexico. Sida, contributions to botany, 14 (3): 339-367.

Provincia Regionale di Palermo, 2009 – Piano di Gestione del Sito Natura 2000 “Isola di Ustica” - SIC/ZPS Cod. ITA 020010. <http://www.artasicilia.eu/> (retrieved on 3rd September 2015).

Raimondo F.M., Domina G., Spadaro V. & Aquila G., 2005a – Prospetto delle piante avventizie e spontaneizzate in Sicilia. Quaderni di botanica ambientale e applicata, 15 (2004): 153-164.

Raimondo F.M., Domina G., Spadaro V. & Aquila G., 2005b – Aggiunte al “Prospetto delle piante avventizie e spontaneizzate in Sicilia”. Quaderni di botanica ambientale e applicata, 16: 219-220.
Raimondo F.M., Domina G. & Spadaro V., 2010 – Checklist of the vascular flora of Sicily. *Quaderni di botanica ambientale e applicata*, 21: 189-252.

Raimondo F.M. & Spadaro V., 2009 – Addenda et emendanda to the “A catalogue of the plants growing in Sicily”. *Flora Mediterranea*, 19: 303-312.

Regione Siciliana, 2014 – Disciplinare Regionale Produzione Integrata 2014. <http://www.regione.sicilia.it/> (retrieved on 3rd September 2015).

Rossi A., 1955 – La viticoltura in Sicilia. *Mori*, Palermo.

Thiers B., 2014 onwards – Index herbariorum: a global directory of public herbaria and associated staff. New York Botanical Garden. <http://sweetgum.nybg.org/ih/> (retrieved on 3rd September 2015).

Tison J.M. & de Foucault B. (eds.), 2014. *Flora gallica. Flore de France*. Biotope Éditions, Mèze.

Vallese F., 1895 – Le viti americane e la viticoltura moderna. *Dottor Francesco Vallardi*, Milano.