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NOTES

THE GENUS *VITIS* L. (VITACEAE) IN CAMPANIA (SOUTHERN ITALY), WITH EMPHASIS ON ALIEN UNITS

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Abstract – In the present paper, based on field, herbarium and bibliographic research, an update concerning the genus *Vitis* in Campania is presented. Five taxa, including three species and two nothospecies, are recorded. *Vitis labrusca* (casual), *Vitis riparia* (casual), *Vitis* ×*instabilis* (casual) and *Vitis* ×*koberi* (naturalized) are reported for the first time in this region. The agricultural activities and artificial green areas are confirmed as starting points for the process of invasion of alien plants in southern Italy.

Keywords: Alien species; Floristic records; Grapevines; Nothotaxa; Vascular flora

Introduction

Vitis L. (Vitaceae) is a genus mainly distributed in the Northern Hemisphere, which includes approximately 60 species with major centers of diversity in China and North America (Ren & Wen, 2007). It contains woody lianas, with leaves alternate, simple, often lobed, sometimes palmately compound, opposite to tendrils, inflorescence a thyrse composed by flowers 5-merous. *Vitis vinifera* L. (grapevine) is one of the world's most important fruit crops, and its cultivation has led to a significant increase in genetic diversity via sexual reproduction. In Europe, the interspecific hybridization of *Vitis* which took place mainly between the late 19th and the mid-20th centuries to address the phylloxera crisis (*Daktulosphaira vitifoliae* [Fitch, 1855], Phylloxeridae, accidentally introduced from North America to France in the second half of the 19th century with plant material), resulted in the creation of hybrids and rootstocks, ultimately contributing to an increase in the diversity of plant material. Recently, some of these hybrids have been formally described for Italy (Ardenghi et al., 2014, 2015a, b) and Spain (Vázquez & García, 2017) according to the International Code of Nomenclature for algae, fungi, and plants (Turland et al., 2018). Currently, four species (*V. labrusca* L., *V. riparia* Michx., *V. rupestris* Scheele, and *V. vinifera* L.) and seven nothospecies (*V.* ×*bacoi* Ardenghi, Galasso & Banfi, *V.* ×*gallica* F.M.Vázquez, *V.* ×*goliath* Ardenghi, Galasso & Banfi, *V.* ×*instabilis* Ardenghi, Galasso, Banfi & Lastrucci, *V.* ×*koberi* Ardenghi, Galasso, Banfi & Lastrucci, *V.* ×*novae-angliae* Fernald, and *V.* ×ruggerii

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Ardenghi, Galasso, Banfi & Lastrucci) are recorded in the Italian vascular flora (Galasso et al., 2018). However, for some areas little is known about their distribution or their invasiveness.

Although the grapevines has been cultivated in Campania since the 4th century BC by the Etruscans with the techniques named "*piantata*" and "*alberata*" (Buono & Vallariello, 2003), the occurrence of spontaneous taxa of *Vitis* across its territory appears sporadic. In fact, in this region only *V. vinifera* was reported (Bartolucci et al., 2018; Galasso et al., 2018).

The aim of this paper is to update the geographical distribution of the taxa within the genus *Vitis* occurring in Campania, reporting for the first time the presence of alien units and their invasion status, and thereby contributing to the knowledge of this still under-investigated genus of vascular plants.

Material and methods

The present study is based on fieldwork carried out from 2011 to 2018, as well as herbaria (PORUN, according to Thiers, 2019) and literature surveys. Collected plant material was deposited in the Herbarium Porticense (PORUN-Herb. Stinca). The species are arranged in alphabetical order and nomenclature follows Bartolucci et al. (2018) and Galasso et al. (2018). The collected specimens were identified according to Ardenghi et al. (2014, 2015a, 2015b) and Ardenghi (2016). For each taxon the following information is provided: currently accepted name; main synonyms; reasons for it being recorded; regional distribution; habitat; presence status (native or alien) and current invasiveness status in Campania (assessed by population monitoring over time according to the terminology of Pyšek et al. [2004] and adapted by Galasso et al. [2018]) for the exotic units; occurrence in Italy; any additional notes; examined herbarium materials (*exsiccata*) arranged by province and collection date, with details (in Italian, according to the information on the specimen label data) about the location, E and N coordinates (UTM, datum WGS84), growth environments, altitude, collection date, collector(s) (*legit*), author(s) of the identification (*determinavit*) and the identity confirmation (*confirmavit*), and herbarium storage code.

The data collected were used to draw up the distribution maps (Fig. 1).

Results and Discussion

Vitis labrusca L.

≡ *Cissus labrusca* (L.) Kuntze
First report for Campania.
Distribution. Rare, recorded from two localities in the provinces of Caserta and Naples (Fig. 1A).
Habitat. Waste land and ruderal places; 6-24 m a.s.l.
Presence status. Casual alien.
Occurrence in Italy. Piemonte (casual), Lombardia (naturalized), Friuli Venezia Giulia (casual), Veneto (casual), Liguria (casual), Emilia-Romagna (naturalized), Toscana (casual), Abruzzo (casual), Lazio (casual), Puglia (doubtful record), Basilicata (casual), Calabria (casual), Sicilia (naturalized), and Sardegna (casual) (Galasso et al., 2018).
Notes. Pignatti (1982) reported *Vitis labrusca* in all Italian regions as "cultivated and rarely subspontaneous". The generic indication for Campania by Conti et al. (2005) may well be based on Pignatti's note. Subsequently the species was excluded from the regional flora (Conti et al., 2007; Celesti-Grapow et al., 2009; Pignatti, 2017; Galasso et al. 2018) since it was only known as cultivated in the region. Nowadays in Campania this North American species is sometimes cultivated in private gardens for fruit consumption and occasionally for domestic wine-making.
Exsiccata. Caserta: Marcianise tra Masseria Taraglione e Vasca Cecere, 440956-4540451, incolto, 24 m s.l.m., 07.05.2015, leg. et det. A. Stinca, conf. N.M.G. Ardenghi (PORUN-Herb. Stinca). Naples: Castellammare di Stabia presso il Miramare, 456306-4506281, linea ferroviaria dismessa, 6 m s.l.m., 27.09.2017, leg. et det. A. Stinca (PORUN-Herb. Stinca).

Vitis riparia Michx.

≡ *Vitis cordifolia* Michx. var. *riparia* (Michx.) A.Gray
≡ *Vitis vulpina* L. subsp. *riparia* (Michx.) Clausen
First report for Campania.
Regional distribution. Very rare, recorded from one locality in the province of Naples (Fig. 1A).
Habitat. Roadsides; 26 m a.s.l.
Presence status. Casual alien.
Occurrence in Italy. Piemonte (invasive), Lombardia (invasive), Veneto (naturalized), Emilia-Romagna (doubtful record), Toscana (invasive), Abruzzo (invasive), Lazio (naturalized), Marche (invasive), Sicilia (doubtful record), and Sardegna (casual) (Galasso et al., 2018).
Exsiccatum. Naples: Vico Equense lungo la SS145 in corrispondenza dello Scoglio dei Tre Fratelli, 452332-4502902, bordo strada, 26 m s.l.m., 04.09.2015, leg. et det. A. Stinca (PORUN-Herb. Stinca).

Vitis vinifera L.

= *Vitis sylvestris* C.C.Gmel., nom. illeg.
= *Vitis vinifera* L. subsp. *sylvestris* (Willd.) Hegi
≡ *Vitis vinifera* L. var. *sylvestris* Willd.

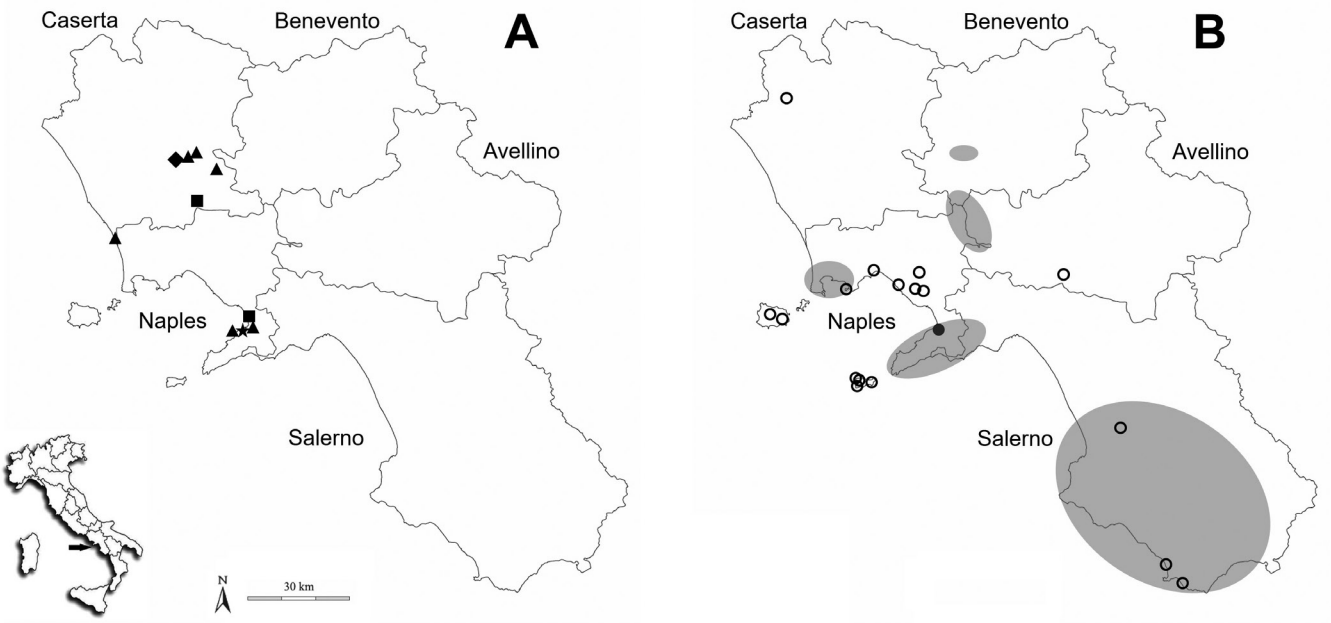

Fig. 1. Distribution in Campania of taxa of *Vitis*. A) *Vitis labrusca* (black squares), *Vitis riparia* (black star), *Vitis* ×*instabilis* (black rhombus) and *Vitis* ×*koberi* (black triangles). B) *Vitis vinifera* based on herbaria (black dot) and bibliographic data with sites specified (white dots) and unspecified (grey areas).

New distribution data for the province of Naples.
Regional distribution. It seems rather widespread, recorded from many localities in all provinces of Campania (Fig. 1B).
Habitat. Waste land, field edges, woods and ruderal environments; 0-500 m a.s.l.
Presence status. Native.
Occurrence in Italy. Native in most Italian regions, except Valle d'Aosta (casual), Trentino-Alto Adige (casual), Veneto (casual), and Sardegna (naturalized) (Bartolucci et al., 2018).
Notes. Some authors (e.g. Webb, 1968) recognized two subspecies within *Vitis vinifera*, i.e. subsp. *vinifera* and subsp. *sylvestris* with flowers hermafrodite and unisexual, respectively. However, sex determination in *V. vinifera* is governed by a single gene (Olmo 1995). Moreover, according to Ardenghi et al. (2014), the naturalization of cultivated grapes (a very large number of cultivars, in Italy known as "*vitigni*") and their hybridization with wild forms have complicated the precise determination of the wild grape's original geographical distribution. For all this reasons, the taxonomic value of the subsp. *sylvestris* is very doubtful, and Ardenghi et al. (2014) does not recognize infraspecific taxa of systematic value. *Vitis vinifera* is widely cultivated in Campania and is recorded in the wild flora in many areas of this region: Campi Flegrei (Motti & Ricciardi, 2005 and other references cited therein), Camposauro (Corazzi, 2008), Capri (Ricciardi, 1996 and other references cited therein), Cilento (Moggi, 2001 and other references cited therein; Motti & Salerno, 2006; De Natale & Strumia, 2007), Ischia (Ricciardi et al., 2004 and other references cited therein); Partenio (Moraldo & La Valva, 1989), Picentini (Moraldo et al., 1985), Naples (De Natale & La Valva, 2000 and other reference cited therein), Nisida (De Natale, 2003), Roccamonfina (Croce et al., 2008), Sorrento Peninsula (Caputo et al., 1994; Salerno et al., 2007) and Vesuvius (Ricciardi et al., 1988 and other references cited therein; Stinca & Motti 2009; Motti & Stinca, 2011). However, most of these literature data should be verified because, since they have been collected before the revision of *Vitis* in Italy by Ardenghi et al. (2014), may refer to alien taxa. Moreover, all the recent reports are clearly referred to cultivated plants and subsequently spontaneized (i.e. *V. vinifera* s.s.), although it is believed that cultivars have a low chance to survive in the wild (Grassi et al., 2003).
Exsiccatum. Naples: Castellammare di Stabia a Privati, 457200-4504184, incolto, 140 m s.l.m., 15.07.2018, leg. et det. A. Stinca (PORUN-Herb. Stinca).

***Vitis* ×*instabilis* Ardenghi, Galasso, Banfi & Lastrucci**

= *Vitis riparia* Michx. × *Vitis rupestris* Scheele
First report for Campania.
Regional distribution. Very rare, recorded from one locality in the province of Caserta (Fig. 1A).
Habitat. River embankments; 20 m a.s.l.

Presence status. Casual alien.
Occurrence in Italy. Piemonte (naturalized), Lombardia (invasive), Trentino-Alto Adige (casual), Veneto (casual), Liguria (naturalized), Emilia-Romagna (naturalized), Toscana (invasive), Marche (naturalized), Abruzzo (naturalized), Lazio (naturalized), Molise (naturalized), Puglia (naturalized), Basilicata (invasive), Calabria (naturalized), Sicilia (invasive), and Sardegna (casual) (Galasso et al., 2018).
Notes. Currently *Vitis* ×*instabilis*, as well as *V. labrusca* and *V. riparia*, needs to be considered casual, since they it reproduces occasionally in Campania, but it cannot yet be ascertained whether they form self-replacing populations due to the length of the reproductive cycle.
Exsiccatum. Caserta: Capua lungo il Fiume Volturno, 433512-4551205, argine fluviale, 20 m s.l.m., 03.06.2014, leg. A. Stinca et G. Salerno, det. A. Stinca (PORUN-Herb. Stinca).

***Vitis* ×*koberi* Ardenghi, Galasso, Banfi & Lastrucci**

= *Vitis berlandieri* Planch. × *Vitis riparia* Michx.
First report for Campania.
Regional distribution. Widespread, recorded from six localities in the provinces of Caserta and Naples (Fig. 1A).
Habitat. Roadsides, field edges, waste land, ruderal environments and humid woods; 15-411 m a.s.l.
Presence status. Naturalized alien.
Occurrence in Italy. Valle d'Aosta (naturalized), Piemonte (naturalized), Lombardia (invasive), Trentino-Alto Adige (invasive), Friuli Venezia Giulia (naturalized), Veneto (invasive), Liguria (naturalized), Emilia-Romagna (invasive), Toscana (invasive), Marche (invasive), Abruzzo (invasive), Lazio (naturalized), Molise (invasive), Puglia (invasive), Calabria (invasive), Sicilia (invasive), and Sardegna (naturalized) (Galasso et al., 2018).
Notes. Within the alien units of the genus *Vitis*, this nothospecies is the most widespread in Campania where it mostly grows in anthropic environments forming self-replacing populations. Therefore, *V.* ×*koberi* can be considered naturalized in Campania.
Exsiccata. Caserta: Caserta a Caserta Vecchia, 446982-4549686, ambiente ruderale, 411 m s.l.m., 21.05.2017, leg. et det. A. Stinca (PORUN-Herb. Stinca); Capua lungo il Fiume Volturno in località Salicelle, 441295-4554274, margine coltivo, 29 m s.l.m., 05.05.2017, leg. et det. A. Stinca (PORUN-Herb. Stinca); Capua sui versanti SW del Monte Tifata, 438332-4551907, margine sentiero, 193 m s.l.m., 04.05.2017, leg. et det. A. Stinca (PORUN-Herb. Stinca); Castel Volturno alla Riserva Naturale Statale Castelvolturno, 417794-4531227, lecceta umida, 15 m s.l.m., 22.07.2011, leg. et det. A. Stinca (PORUN-Herb. Stinca). Naples: Castellammare di Stabia a Privati, 457287-4504156, incolto, 134 m s.l.m., 11.08.2016, leg. et det. A. Stinca (PORUN-Herb. Stinca); Vico Equense lungo la SS145 in corrispondenza dello Scoglio dei Tre Fratelli, 452332-4502902, bordo strada, 26 m s.l.m., 04.09.2015, leg. et det. A. Stinca (PORUN-Herb. Stinca).

Conclusions

The genus *Vitis* in Campania currently comprises three species and two nothospecies. Four of these units, all non-native, were first discovered in the region during the present study. As shown in Fig. 1A, *Vitis* ×*koberi* is the most frequent alien taxon and the only one regarded here as naturalized. As in other Mediterranean regions (such as Sicily: Ardenghi & Cauzzi, 2015), this may be related to the greater drought resistance and limestone-based soils of this hybrid which has thus been most widely cultivated in the study area. Although *Vitis vinifera* is considered a native plant in Campania, all its recent discoveries and all other taxa examined have escaped from cultivation. Therefore, agricultural activities and artificial green areas are confirmed as starting points for the process of invasion of alien plants in southern Italy (Stinca et al., 2017; Motti et al., 2018). However, further investigations are indispensable to define the distribution range of these taxa and their invasiveness in Campania.

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