

New data about the distribution of *Ipomoea imperati* (Vahl) Griseb. (Convolvulaceae) in Sicily

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ABSTRACT Three new localities of *Ipomoea imperati* (Vahl) Griseb. (Convolvulaceae) from south-western Sicily are here reported. Previously this species was known in Italy from a single locality in the eastern coast of Sicily and from Calabria, along the Tyrrhenian coasts.

KEY WORDS Coastal flora; rare species; south-western Sicily.

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INTRODUCTION

Ipomoea imperati (Vahl) Griseb. is a rhizomatous geophyte with a pantropical distribution and records in several temperate-warm and tropical areas of Central and North America, Asia, Pacific and Atlantic islands, Africa, Australia, Canary Islands, and the Mediterranean Basin (Fang & Staples, 1995; Lonard & Judd, 1999; Silvestre, 2012), and insular India (Naik et al., 2019). According to different authors (McDonald, 1991; Silvestre, 2012), the native status of this species in the Mediterranean is still debated, in fact, it is considered by many authors as an alien invasive species (Sanz Elorza et al., 2001 & 2004; García De Lomas et al., 2015; Roy et al., 2020). A recent study on the genetic structure of *I. imperati* (Cennamo et al., 2012) identifies in one or more transatlantic migration events (not attributable to anthropic and pre-Columbian causes) the arrival and subsequent dispersion of the species on coasts of the Mediterranean. The presence of small populations of *I. imperati* on the coasts of various Atlantic islands supports this hypothesis: the Azores Islands, the Cape Verde Islands (Hansen & Sunding, 1993) and the Madeira Archipelago (Da Silva, 2002). The molecular investigations of Wood et al. (2020) seems to confirm the American origin of the species.

The reconstruction of the Mediterranean distribution of *Ipomoea imperati* (Fig. 1), carried out on the basis of what was proposed by Turrisi (2001) and integrated by other reports (Rigual, 1984; Peris et al., 1984; Mateo & Aguilera, 1986; Cobo et al., 2005; García De Lomas et al., 2015; Cattano & Grano, 2018; Bartolucci et al., 2019), shows a prevalent eastern distribution on the Turkish, Lebanese, Syrian, Israeli, Jordanian coasts and on the sandy beaches of the islands of Aegean Sea, while further west, the species is distributed in a fragmentary and point-like way in southern Europe (Spain and Italy), Sicily, and in North Africa (Egypt, Libya and Algeria), with transgressions up to the Moroccan Atlantic coast (Mohamed & Mohamed, 1998). According to Silvestre (2012) the report for the Island of Cabrera in the Balearic Islands (Palau Ferrer, 1954, sub *Hipomea stolonifera* L.) should be excluded since it is likely to be attributed to *Calystegia sepium* (L.) R. Br.

Concerning the Italian distribution of *Ipomoea imperati*, Pignatti (1982) reports it, sub *I. stolonifera* (Cyr.) Gmelin, with certainty only for the Island of Ischia in the Campania Archipelago on the basis of Gussone (1854) [sub *Batatas sinuata* Guss.], and in other localities in the Gulf of Naples, perhaps incorrectly mentioned, including Capri. Subsequently

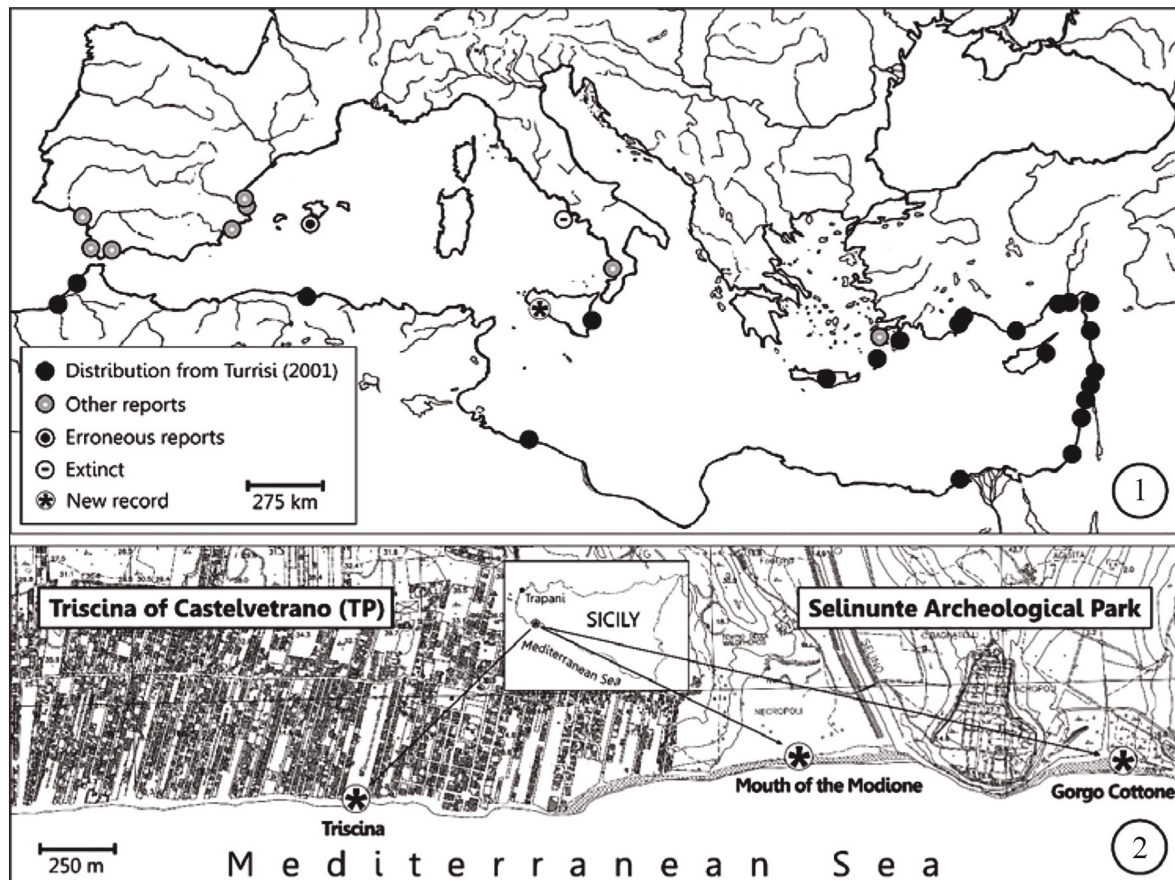


Figure 1. Distribution of *I. imperati* in the Mediterranean Basin reproduced from Turrisi (2001) and integrated.
 Figure 2. Position of the three population in south-western Sicily.

La Valva & Sabato (1983), typifying the name of the species, reported its definitive disappearance from all the localities known up to that moment, including the *locus classicus* of Bagnoli, near Naples, where Petagna (1787) had described it sub *Convolvulus sinuatus* Petagna. More recent confirmation of the lack of this species on the islands of Ischia and Capri can be found in Ricciardi (1998) and Ricciardi et al. (2004). For these reasons *I. imperati* is considered extinct in the Italian territory by Conti et al. (1997) in the Red Lists of Plants of Italy.

Turrisi (2001) reports the species from Sicily (in the coast near Catania) and after about twenty years Bartolucci et al. (2019) records a further station of *I. imperati* in Calabria, along the Tyrrhenian coast of Catanzaro (in Gizzeria), the only certainly confirmed location for peninsular Italy.

The Sicilian locality (Turrisi, 2001) at the mouth of the San Leonardo River, on the border between the provinces of Catania and Syracuse, hosts a small

population that covers about 170 square meters. In this locality, there are five subpopulations located along a stretch of coast of about 1 km characterized by a dune cord strongly altered by residential and tourist buildings. *I. imperati* grows on young dunes about one meter high, 35–40 meters away from the sea, and becomes part of vegetation aspects attributable to the *Ammophiletea* class Br.-Br. & R. TX 1943 (Turrisi, 2005).

In this contribution three micro-populations of *I. imperati* are reported, from western Sicily, over 200 km from the single locality on the island so far known.

MATERIAL AND METHODS

The survey was conducted in five years (2015–2020) and is part of a monitoring of two macro-areas within the SIC ITA010011 - Capo Granitola

Dune System, Porto Palo and Mouth of the Belice River, aimed at detecting the differences between the floristic check-lists of the sector subject to more rigorous control (Archaeological Park of Selinunte) and the area of Triscina (Municipality of Castelvetro) which suffers a strong anthropogenic pressure due to the excessive population density close to the residual dune system.

Pignatti (2017) was used to identify the species, while for the bioclimatic classification of the area, Gianguzzi et al. (2015) and Bazan et al. (2015) were used.

One herbarium specimen from Triscina was deposited in the *Herbarium Mediterraneum Panormitanum* (PAL).

RESULTS

Three populations of *I. imperati* were found at the Gorgo Cottone, at the mouth of the Modione River and at the beach of Triscina in the territory of Castelvetro (Trapani) (Fig. 2), along a coastal belt of about three kilometers of thermo-Mediterranean bioclimate (average annual temperatures between 18–19 °C) with a higher dry ombrotype (average annual rainfall between 500–600 mm) (Bazan et al., 2015; Gianguzzi et al., 2015). These populations of only a few individuals grow at about 2–4 m s.l.m. along the first dune front on a total area of about 200 square meters. The populations are isolated from each other and show a high coverage index (70–80%) creating almost monospecific consortia. These dunes have been affected by many anthropic activities perpetuated over the years despite this stretch of coast is now included in the SIC (ITA010011).



Figure 3. Specimen in bloom (06 august 2016).

In these environment *I. imperati* participates with other perennial psammophilous taxa belonging to the *Ammophiletea* class [*Achillea maritima* (L.) Ehrend. & Y.P. Guo, *Echinophora spinosa* L., *Elymus farctus* (Viv.) Melderis, *Eryngium maritimum* L., *Pancratium maritimum* L., etc.] to the consolidation of embryonic dunes. The same was observed in eastern Sicily (Turrisi, 2005) and in western Mediterranean (Peris et al., 1984). The robust plagiotropic root system of *I. imperati* can reach even 1.8 meters in depth (Lonard & Judd, 1999). This is a recurrent morphological character among the species of this class. It has been found that the populations of south-western Sicily bloom from the late spring until autumn (May–October) (Fig. 3) and bear fruits in mid summer (Fig. 4). However, no significant variation in the number of individuals of the three populations were recorded during the five-year period of observation and the young plantlets found are clonal individuals generated by silted stolons. Outside of these restricted areas, the species is absent and does not seem able to spread through seeds.

CONCLUSIONS

The Sicilian stations of *Ipomoea imperati* in the eastern and in the western coast of the Island have great affinity under the bioclimatic (same average thermo-pluviometric values), ecological (embryonic dunes) and phytosociological aspects (*Ammophiletea* class). In both coasts poor germinability of seeds was found, and the reproduction is mainly vegetative (Turrisi, 2005, 2007).

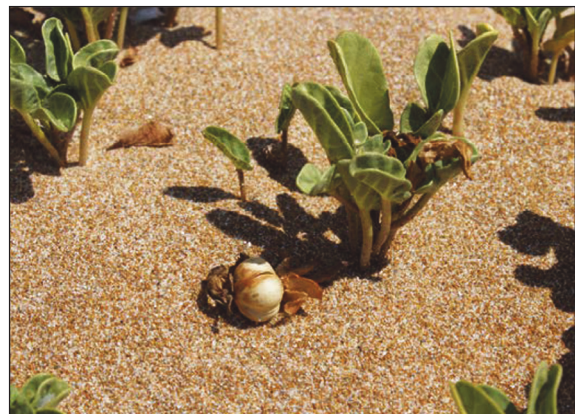


Figure 4. Specimen in fruiting (12 august 2020).

All the Sicilian sandy coasts suffer from heavy anthropogenic pressure (Domina et al., 2018). Also the entire beach of the south-eastern coast of Trapani, where the three new populations are found, has been subjected to deep restructuring works both near Triscina and on the edge of the promontory of Selinunte. Here, the works to fence the archaeological park caused a strong impact on the dune ecosystem. Therefore, the serious risk of a possible population contraction that only a correct management of the SIC could avoid remains. This species, for the reasons set out above, is included among the taxa at risk of the flora of Sicily (Raimondo et al., 2011) as CR.

The discovery of the three small populations of *I. imperati* in an area already subject to investigation surveys (Frei, 1937; Brullo et al., 1974; Troia & Spallino, 2009; Scafidi & Raimondo, 2018) raises some questions about arrival time of *I. imperati* in the area of Trapani. On the other hand, given the smallness and fragmentation of these populations, the species could have escaped even the most recent observations and for this region, it does not seem absurd to assume that the species may have a wider distribution in Sicily, albeit discontinuous and punctual.

However, it remains to be clarified, through medium-term monitoring, whether the species may show a tendency to invasion in ever wider stretches of coastline, as found in numerous locations in southern Spain (Sanz Elorza et al., 2004).

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