NOTA BREU

# *Salmiopuntia salmiana* (Cactaceae), a new potentially invasive Cactaceae in the Mediterranean Basin

# *Salmiopuntia salmiana* (Cactaceae), una nova cactàcia potencialment invasora a la conca mediterrània

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According to the known information, this note exposes the first data about the presence in Europe of *Salmiopuntia salmiana* (Parm. ex Pfeiff.) Guiggi as an alien plant. Outside its native range in South America we only know a record of this species in South Africa, where a population with invasive potential is known (Walters *et al*., 2011). It also seems to be locally naturalized, from garden escapes, in areas of Argentina outside its original range.

The new European site is located in southern Catalonia: Montbrió del Camp, left bank of the Riudecanyes stream, towards Molí del Rafel, 31TCF3053 (ETRS89), 120 m a.s.l., 11 January 2018. In this place *S. salmiana* has established a population that lives in dry meadows, scrubland and clear pine forests.

*Salmiopuntia salmiana* is a cactus from northern Argentina, southern Bolivia and western Paraguay, in the Chaco and Espinal phytogeographic regions (Lambert, 1997; Kiesling *et al*., 2011). The taxonomy and nomenclature of this species has experienced changing treatments. Traditionally, the most commonly used name has been *Opuntia salmiana* Parm. ex Pfeiff. Some authors have included it in the genus *Austrocylindropuntia* for its cylindrical stems, as *A. salmiana* (Parm. ex Pfeiff.) Backeb. In recent times, several works based on molecular data (Griffith & Porter, 2009; Majure *et al*., 2012; Majure & Puente, 2014) revealed a significant divergence from *Opuntia* in the strict sense, a result that justifies its inclusion in the monotypic genus *Salmiopuntia*, revalidated by Guiggi (2010). Other authors consider preferable to keep this species in *Opuntia* until more information is available (Realini *et al*., 2014).

Figure 1. *Salmiopuntia salmiana*. General habit.

Figure 2. *Salmiopuntia* population in a dry Mediterranean meadow.

Figure 3. Detail of the fruits (red) and fruit-propagules (green, above).

It is a low succulent shrub, generally less than 50 cm high, branched (Fig. 1). The cladodes have a subcylindrical section when hydrated, but are crumpled and slightly flattened when dehydrated. They often become reddish when exposed to sun-

Figure 4. Propagules attached to a boot.

light. The spines are weak, bristle-like, 6-8 mm long. Flowers are white or yellow and the fruits red, 2-2.5 × 1-1.5 cm, thorny, usually without seeds or only few seeds. The upper areoles of the fruits develop spiny propagules which are the main mechanism of reproduction (vegetative) of this species (Fig. 3).

*Salmiopuntia salmiana* has a general appearance quite similar to *Opuntia aurantiaca* Lindl., a species that is also native from South America (northeastern Argentina and Uruguay) and is invasive in subtropical areas of South Africa and Australia (Weber, 2016). In fact, it has been suggested that *O. aurantiaca* is of hybrid origin and that parental species can be *S. salmiana* and *O. discolor* Britton & Rose (van de Venter *et al*., 1984). The typical forms of *O. aurantiaca* are characterized by their flattened cladodes, but there are also less frequent morphotypes with subcylindrical cladodes that are more similar to *S. salmiana*. These forms can be distinguished from *S. salmiana* mainly by their strongest spines and by the lack of prolific propagules in the fruits (van de Venter *et al*., 1984; Walters *et al*., 2011). *Opuntia aurantiaca* has also been detected recently in five sites of the eastern Iberian Peninsula (Catalonia and Valencia), where it has established small populations (Guàrdia Valle, 2016; Vázquez & Albiach, 2016).

The Iberian population of *S. salmiana* is located in a Mediterranean area of low altitude, about 7.5 km from the sea, far from houses and gardens, but next to a forest road. The landscape is a mosaic of fields and forests of *Pinus halepensis*, next to a temporary stream. *Salmiopuntia salmiana* is found in the two margins of the forest road, in a 2-6 m wide strip. It forms dense aggregations in open places with carbonated soils, especially where there are stone accumulations - in part of artificial origin - and in rocky patches that were originally occupied by succulent plants of the *Sedum* genus and annual species (Fig. 2). It is also found, in weaker densities, in clear pine forests with an herbaceous understory. At present *S. salmiana* area of occurrence is close to 1 ha. The number of individuals is estimated in some hundred, but it has not been accurately quantified. This population is probably originated by garden throw-outs, despite it is a species rarely cultivated and there are no close gardens. This species shows a high invasive potential in this location due to several factors: it disperses easily, the population is in a place that increases the possibilities of dispersion (a few meters from a forest road and a water course) and there is a high availability of potentially suitable habitats (dry mediterranean meadows and open bush communities). Although the current population is very localized, *S. salmiana* has already achieved strong local densities, which shows a great transformation capacity of the natural and seminatural local habitats.

Future expansion at short and medium distances is highly probable, because the fruit propagules easily attach to the animal's hair and to people's shoes and clothing (Fig. 4), so they can be quickly transported at distances of tens or hundreds of metres. The dispersion distance can be multiplied if the propagules adhere to people or animals that travel by vehicles and stop at the edge of the road adjacent to the cactus population. There is also a high probability of some kilometres downward dispersions by water, as many of the plants grow alongside a temporary stream that has very important and abrupt increases in flow.

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