Fl. Medit. 28: 393-397
doi: 10.7320/FlMedit28.397
Version of Record published online on 20 December 2018

M. L. Gargano, G. Mandracchia, G.Venturella & R. Calvo

A revision of *Tamarix* specimens (*Tamaricaceae*) kept in the BCN herbarium of Barcelona (Spain)

Abstract

Gargano, M. L, Mandracchia, G., Venturella, G. & Calvo, R.: A revision of *Tamarix* specimens (*Tamaricaceae*) kept in the BCN herbarium of Barcelona (Spain). — Fl. Medit. 28: 393-397. 2018. — ISSN: 1120-4052 printed, 2240-4538 online.

The taxonomy of genus *Tamarix* L. is notoriously controversial and many taxa are still not or wrongly identified. A huge number of tamarisk specimens are kept in the most important herbaria of Spanish universities but many labels needs a deep nomenclatural revision. The *Tamarix* collection in Universitat de Barcelona (BCN) is composed by 158 samples, collected in different Comunidades Autónomas de España, and corresponding to 14 taxa.

Key words: Tamarisks, taxonomy, floristics, distribution, Iberian Peninsula.

Introduction

According to Flora Iberica the tamarisks flora of Spain is represented by seven taxa (Castroviejo & al. 1993). Additional ecological data are reported in the Spanish Global Biodiversity Information Facility (Otegui & al. 2013).

In Catalunya, Gargano & al. (2009) identified *T. arborea* (Ehrenb.) var. *subvelutina* Boiss. among the cultivated plants located along the Passeig Maritim de la Barceloneta, in the town of Barcelona.

However, a huge number of tamarisks specimens are kept in the most important herbaria of Spanish universities but many labels needs a deep nomenclatural revision.

As already highlighted in other European countries, the review of the herbarium samples is not only useful to verify the distribution in a territory of each taxon but can also demonstrate the presence of species not yet reported allowing the verification of their existence in nature (Venturella & al. 2012; Mandracchia & al. 2017).

In this paper, we provided a revision of tamarisk specimens kept in the Herbarium of the University of Barcelona (BCN).

Materials and Methods

Since the habitus, shape and color of inflorescences of tamarisks are the main features which lead to taxonomic confusion and misidentification of taxa we adopted for the revision of specimens the same methodology proposed by Baum (1978) and, more recently, by Alaimo & al. (2013) and Mandracchia & al. (2017).

In particular, the dried leaves and racemes were re-hydrated in boiled water at 90°C for 2-4 minutes. The flowers were observed under stereomicroscope to separate the disk and the stamens by using laboratory tweezers.

A distribution map of tamarisk species in Spain, based on the identification of herbarium samples, is also provided.

Herbarium materials

The specimens kept in BCN were collected in the last century and includes the collection of Sennen (1926) and recent accessions derived from a PhD thesis (Royo Pla, unpublished results).

From the analysis of the herbarium labels it was not possible to understand with certainty whether the species were spontaneous, cultivated or naturalised.

Therefore, in this publication we have only reported in the Electronic Supplementary File 1 (ESF 1) the information contained in the labels and we have carried out a nomenclatural update of each specimens.

Each herbarium specimens was pre-emptively catalogued and photographed together with a close view of the label. The labels of specimens kept in BCN are mainly filled out by hand and in italics.

Using web sites and the Spanish cartographic system we obtained the right references of localities of collection and the name of the administrative units (Comunidades Autónomas).

The selected 140 specimens belongs to 13 Comunidades Autónomas de España.

Results

The collection of tamarisks kept in BCN is composed by 158 specimens. This number refers to the samples included in herbarium prior of our nomenclatural update. The specimens has been collected in different Comunidades Autónomas de España from the beginning of last century until 2000 and corresponding to 14 taxa.

A specimens shows intermediate characters between *Tamarix arborea* (Sieb. ex Ehrenb.) Bge. and *T. canariensis* Willd., two specimens are characterized by mixed features of *T. africana* Poiret and *T. boveana* Bge., eight specimens have intermediate characters between *T. gallica* L. and *T. canariensis* Willd.

Owing to the bad conditions of conservation and/or the lacking of floral elements other seven specimens were unidentified.

Therefore the investigation was concentrated on the remaining 140 herbarium samples (ESF 1: Table 1).

52 specimens (37%) corresponds to *T. arborea* (Sieb. ex Ehrenb.) (i.e. 51 to *T. arborea* var. *arborea* and 1 to *T. arborea* var. *subvelutina* Bge.). 27 specimens (19%) were identified as *T. canariensis*, 24 specimens (16%) can be attributed to *T. africana* [in particular, 14 corresponding to *T. africana* var. *africana* (1 cultivated) and 10 to *T. africana* var. *fluminensis* (Maire) Baum]. 11 specimens (8%) corresponds to *T. parviflora* DC. (6 cultivated and 5 naturalized) while 8 specimens (6%) corresponds to *T. gallica*. *T. chinensis* Lour. (2) *T. dalmatica* Baum. (1); *T. mannifera* (Ehrenb) Bge. (3); *T mascatensis* Bge. (1); *T. meyeri* Boiss. (7); *T. octandra* (M.B.) Bge (1); *T. rosea* Bge. (1); *T. tetragyna* Ehrenb. (1); *T. boveana* Bge. (1).

Conclusions

In addition to *T. africana*, *T. mascatensis* Bge., *T. canariensis*, *T. gallica*, *T. parviflora*, *T. boveana* and, *T. dalmatica* Baum already reported from Spain by Cirujano (1993), we provide new distributive data about *T. meyeri* Boiss. and *T. mannifera*, two species never reported from Spain.

In BCN, specimens of *T. boveana*, *T. dalmatica* and, *T. mascatensis*, already reported from Spain by Tutin & al. (1968), are also kept while *T. chinensis* Lour., *T. octandra* (M.B.) Bge., *T. rosea* Bge. and, *T. tetragyna* Ehrenb. are new records from Spain.

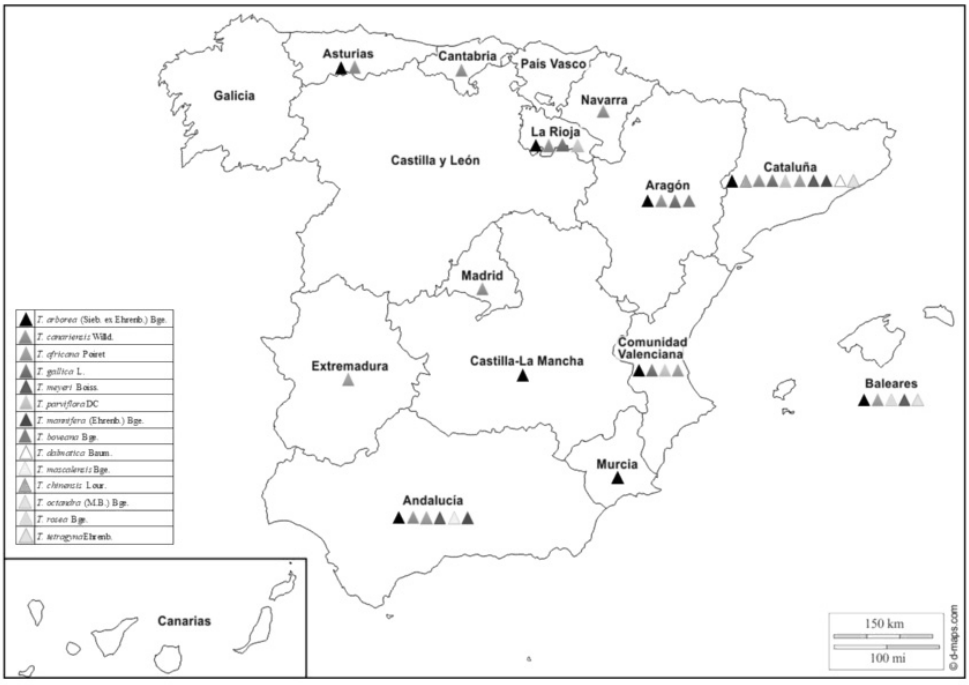

Fig. 1. Up-to-date distribution map of *Tamarix* species in Spain according to the revision of BCN herbarium.

The most investigated Comunidad Autónoma is Catalunya (10 taxa) followed by Andalucía (6 taxa). Four tamarisks species are reported from La Rioja, Aragón, and Islas Baleares. *Tamarix arborea* var. *arborea* and *T. arborea* var. *subvelutina* are widely distributed in Spain.

The revision of BCN Herbarium (ESF 1) permitted also to draw up a new distribution map of *Tamarix* species in Spain (Fig. 1).

The samples BCN 30693 and BCN 58918 are reported in the labels from two different localities of the Comunidad Autónoma of Extremadura, respectively in Sesimbra and Cascais (ESF 1: Table 2). However, these two localities, belongs to Portugal. For this reason, *T. arborea* var. *arborea* is not reported in the new distribution map for the Comunidad Extremadura (Fig. 1).

Five herbarium labels contains wrong data on the Comunidades Autónomas, or the localities or do not report any indication of Comunidades Autónomas (ESF 1: Table 3).

The results of this study could be an incentive for botanists to expand the floristic exploration of the genus *Tamarix* in Spain. Similarly to what have been already noted in other territories (Gargano 2018) the introduction of some species from south-eastern countries as ornamental or to redevelop coastal environments stimulate in most cases their diffusion in nature that does not exclude the possibility of finding new species for the Spanish flora.

Acknowledgements

The authors would like also to thank the staff of the Herbarium (BCN) of the University of Barcelona for providing their *Tamarix* collection.
Both authors contributed equally to this work.

References

Alaimo, M. G., Gargano, M. L., Vizzì, D. & Venturella, G. 2013: Leaf anatomy in *Tamarix arborea* var. *arborea* (Tamaricaceae). Pl. Biosyst. **147(1):** 21-24. doi: 10.1080/11263504.2012.704888

Baum, B. R. 1978: The genus *Tamarix*. – Jerusalem.

Cirujano, S. 1993. *Tamarix* L. – Pp 437-443 in: Castroviejo, S., Aedo, C., Cirujano, S., Laínz, M., Montserrat, P., Morales, R., Muñoz Garmendia, F., Navarro, C., Paiva, J. & Soriano, C. (eds), Flora Iberica, **3.** – Madrid.

Gargano, M. L. 2018: The genus *Tamarix* (*Tamaricaceae*) in Apulia (southern Italy). – Fl. Medit**. 28:** 137-143. doi: 10.7320/FlMedit28.137

—, Mandracchia, G. & Venturella, G. 2009: *Tamarix arborea* var. *subvelutina* (*Tamaricaceae*), new from Spain. – Lagascalia **29:** 320-321.

Otegui, J., Ariño, A. H., Mara, Encinas, A., Pando F. 2013: Assessing the primary data hosted by the Spanish node of the Global Biodiversity Information Facility (GBIF). – PLoS ONE **8(1):** e55144. doi: 10.1371/journal.pone.0055144

Mandracchia, G., Venturella, G. & Gargano, M. L. 2017: First record of *Tamarix macrocarpa* (*Tamaricaceae*) for Europe. – Pl. Biosyst. **151(4):** 577-580. doi: 10.1080/11263504.2017.1320315

Royo Pla, F. 2006: Flora i vegetació de les planes i serres litorals compreses entre el riu Ebro i la serra d'Irta. PhD thesis. Univeristat de Barcelona, Spain. https://www.tdx.cat/handle/10803/952 [Last Accessed 06/06/2018]

Sennen, F 1926: Plantes d'Espagne: diagnoses et comentaires. – Zaragoza.

Tutin, T. G., Heywood, V. H., Burges, N. A., Moore, D. M., Walters, S. M., Webb, D. A. 1968. Flora Europaea, **2. –** Cambridge.

Venturella, G., Gargano M. L. & Mandracchia, G. 2012: First record of *Tamarix meyeri* (*Tamaricaceae*) for western Europe. – Pl. Biosyst. **146(2):** 484-489. doi: 10.1080/11263504.2011.629010

Addresses of the authors:
Maria Letizia Gargano[1], Gerlando Mandracchia[2], Giuseppe Venturella[2] & Roberta Calvo[2],
[1]Department of Earth and Marine Sciences, University of Palermo, Viale delle Scienze, Bldg. 16, I-90128 Palermo (Italy). E-mail: marialetizia.gargano@unipa.it
[2]Department of Agricultural, Food and Forest Sciences, University of Palermo, Viale delle Scienze, Bldg. 5, I-90128 Palermo (Italy). E-mail: gmandra@gmail.com, giuseppe.venturella@unipa.it, roberta.calvo@unipa.it