



Morphometric characterization of *Eryngium viviparum* (Umbelliferae): description of a new subspecies from the Iberian Peninsula

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Abstract

Eryngium viviparum is an endemic plant of the Atlantic regions of Europe. Surveys carried out in recent years in the wetlands of northwest Spain have led to the identification of several previously undetected subpopulations of this species in inland areas with markedly Mediterranean bioclimatic characteristics that constitute the southern limit of this species. However, these populations overlap with the distribution of the Iberian endemic *E. galioides*, similar in size and morphology. We developed a biometric study on herbarium vouchers that has enabled us to identify a new subspecies, subspecies *bariegoi*, distributed in a limited geographical zone in Mediterranean areas of the northwest Iberian Peninsula.

Key words: taxonomy, aquatic plant, endemic plant, threatened plant, conservation, Spain

Introduction

Eryngium viviparum J.Gay (1848: 171) is a small plant growing in seasonally flooded sites (Cook 1983, 1990; Arts & Den Hartog 1990; Rodríguez-Oubiña *et al.* 1997). Since 1979 this species has been included in Annex I (strictly protected plant species) of the Berne Convention (1979), and is also listed as a priority species in Annex II of The Habitats Directive (1992). Today there is a single known subpopulation in France (in Morbihan, Brittany) (Annezo *et al.* 1995; Buord *et al.* 1999). The remaining subpopulations are all in northwest Spain, in the Region of Galicia, where it is considered threatened and has recently been rated as “*Endangered*” (Romero & Rubinos 2003; Romero *et al.* 2004).

Surveys carried out in recent years in the wetlands in the northwest Iberian Peninsula have led to the detection of several previously undetected subpopulations of this species in inland areas with markedly Mediterranean bioclimatic characteristics. These subpopulations, located in the Region of Castile-León, constitute the southern limit of this species’ known range (see Fig. 1). Nevertheless, recent molecular data on this population has shown that the genetic distance between the Atlantic subpopulations (Galicia and Brittany) is lower than the distance between the Spanish subpopulations (Galicia and Castile-León) (Rodríguez-Gacio *et al.* 2009). Moreover, the monitoring of the northwest Iberian subpopulations has revealed morphological differences between them. In this paper we show that these differences are measurable. This information will be important for the preservation of the genetic and morphological variability of this rare species, which is associated to a very selective habitat (Menges 1986; Soltis & Gitzendanner 1998).

Material & methods

Morphometric data

This study was based on specimens from all three subpopulations deposited in the following herbaria: the Paris Herbarium (Herbier National de Paris-Muséum National d’Histoire Naturelle), the location of the original type

Conservation status:—According to IUCN (2012) the species can be assigned as endangered (EN, criterion and subcriteria B2ac), due to its highly restricted area of occupancy (less than 500 km²) and to the severe fragmentation of its population, which is linked to a very selective habitat “seasonal pools or temporary Mediterranean pools”. These habitats are affected by different types of disturbances: changes in land use (drainage, water pollution, etc.), or human or animal pressure, which result in habitat loss. In addition, the number of mature individuals is subject to extreme annual fluctuations because summer heat waves do not allow the development of fruits. As a consequence, climatic change is also a potential risk for this species.

Key for the European aquatic taxa of the genus *Eryngium*

1. Width of the stems 1(–2) mm, basal leaves green when the plant is in flower: Soft in texture, biennial plant 2
- Width of the stems (2–) 3–4 mm, dry basal leaves when in flower, spiny annual plant *E. galioides*
2. Bracteoles ≤ 7 times longer than wide, finely denticulate or with spinescent teeth *E. viviparum* subsp. *viviparum*
- Bracteoles > 7 times longer than wide, spiny plant *E. viviparum* subsp. *bariegoi*

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