

CONTRIBUCIONES A LA FLORA VASCULAR DE MARRUECOS (16)

16. *BELLIS PROSTRATA* POMEL (ASTERACEAE), A NEW SPECIES FOR MOROCCO

Laila RHAZI*, Serge D. MULLER, Mouhssine RHAZI, Patrick GRILLAS, Mohamed IBN TATTOU, Er-Riyahi SABER, Mohammed TELLAL, Siham BOUAHIM, Btissam AMAMI, Mohammed LOUTFI, Amina DAOUD-BOUATTOR, Semia BEN SAAD-LIMAM, Zeineb GHRABI-GAMMAR, Gérard de BÉLAIR & Nieves GARCIA

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Bellis prostrata Pomel (*Asteraceae*), una nueva especie para Marruecos

Key words. North Africa, endemic species, conservation, temporary wetland.

Palabras clave. Norte de África, especie endémica, conservación, humedales temporales.

ASTERACEAE

Bellis prostrata Pomel Nouv. Mat. Fl. Atlant. 287 (1875).

= *Bellis repens* sensu auct. Maghreb

= *Bellis radicans* Coss. & Dur. ex Batt. & Trab. Fl. Algér. (Dicot.): 422 (1890).

MOROCCO: Benslimane plateau, temporary pool of Aïn Sferjila, 33°39'40"N 07°09'50"W, 202 m a.s.l., 07-05-2008, collected by L. Rhazi & S.D. Muller, Herb. Institut Scientifique de Rabat.

Floras of North Africa indicate *Bellis prostrata* as an Algero-Tunisian endemic restricted in the coastal wetlands of NE Algeria, between Senhadja and El Kala (Quézel & Santa, 1963: 922) and in coastal reliefs of N Tunisia, between Hammam Lif and Tabarka/Aïn Drahem (Pottier-Alapetite, 1981: 952). It is a perennial herb with cuneiform-spatulate glabrous leaves. Each of the prostrated stems bears several large capitules, the apical one being on a long peduncle. These features allow distinguishing this species from the dwarf *Bellis annua* L.,

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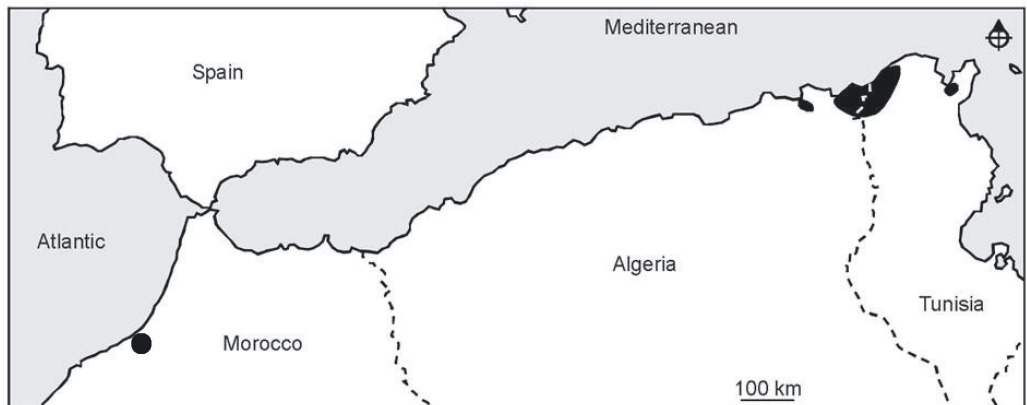


Figure 1: Distribution of *Bellis prostrata* in North Africa. *Distribución de Bellis prostrata en el Norte de África.*

which is abundant in a large variety of wetlands throughout the Mediterranean basin.

Investigations conducted in temporary wetlands of the coastal Meseta of W Morocco (Benslimane region) lead to the discovery of *Bellis prostrata* in a small endoreic temporary pool (ca. 1 ha) of the quartzitic-limestone plateau of Benslimane. The pool of Aïn Sferjila, supplied in winter and spring by several intermittent springs, is surrounded by a degraded cork-oak forest (*Quercus suber* L.) and eucalyptus plantations (*Eucalyptus camaldulensis* Dehnh.). A few eucalyptus trees develop within the pool, which is moreover affected by livestock (grazing and water use).

Phytosociological relevés have been realised within the *Bellis prostrata* population, at the edge of the pool, in May 2008 and April 2009. The individuals of *B. prostrata* have been counted in both years on the entire site, encompassing the pool and the adjacent springs. These years were climatically different: 2008 was very dry (ca. 60% of the annual average of precipitations of Benslimane region), and 2009 was very humid (ca. 160% of the mean). Two sediment samples were taken respectively from the centre and from the edge

of the pool, respectively, and physicochemical characteristics were measured at the laboratory.

Phytosociological relevés (tab. 1) comprise 32 species, including a rare species in Morocco (*Apium inundatum* (L.) Rchb.f.), and an endemic species strictly restricted to temporary pool (*Sedum jahandiezii* Batt.). 18 species were found the first year, and 26 the second year. The closest spring harbours similar plant communities, except for 5 species characteristic of the temporary pools of the region (*Crassula vaillantii* (Willd.) Roth, *Isoetes velata* A. Braun, *Lotus hispidus* Desf. ex DC., *Lythrum borysthenticum* (Schrank) Litv. and *Trifolium ornithopodioides* L.; Rhazi *et al.* 2009). The population of *Bellis prostrata* was composed of 350 individuals in 2008, and of 410 in 2009, most of them located around the pool, with a few ones scattered in adjacent springs.

The clayey-silty sediment of the pool is organic, poorly mineralised, with an acidic pH (tab. 2). The eutrophic state of the pool is also shown by the abundance of *Lemna minor* L., *Apium nodiflorum* (L.) Lag., and of the invasive tropical Pteridophyte *Azolla filiculoides* Lam.

The finding of *Bellis prostrata* in Morocco, about 1300 km away from its Algero-Tunisian distribution area (fig. 1) raises a number of

	Pool	Pool	Springs
Surface area of relevé (m ²)	25	25	36
Water depth (cm)	Wet soil	Saturated soil	4
Date	19/05/2008	04/04/2009	04/04/2009
<i>Alisma plantago-aquatica</i> L.	+	+	
<i>Anagallis arvensis</i> L.		+	
<i>Apium inundatum</i> (L.) Rchb.f. *	1	2	2
<i>Apium nodiflorum</i> (L.) Lag.	+	2	1
<i>Arisarum vulgare</i> Targ.Tozz.		+	+
<i>Azolla filiculoides</i> Lam.	1	2	
<i>Baldellia ranunculoides</i> (L.) Parl.	+	1	+
<i>Bellis prostrata</i> Pomel *	3	4	2
<i>Callitriche stagnalis</i> Scop.	2	2	
<i>Crassula vaillantii</i> (Willd.) Roth			+
<i>Daucus carota</i> L.		+	
<i>Eleocharis palustris</i> (L.) Roem. & Schult.	+	+	
<i>Isoetes velata</i> A. Braun			3
<i>Isolepis cernua</i> (Vahl) Roem. & Schult.	+	1	1
<i>Juncus bufonius</i> L.	+	2	3
<i>Lemna minor</i> L.	2	2	
<i>Leontodon taraxacoides</i> (Vill.) Mérat		2	
<i>Lotus hispidus</i> Desf. ex DC.			+
<i>Lythrum borysthenticum</i> (Schrank) Litv.			+
<i>Lythrum hyssopifolia</i> L.	+	+	
<i>Plantago coronopus</i> L.		1	1
<i>Poa annua</i> L.	+	1	1
<i>Polypogon monspeliensis</i> (L.) Desf.	1	2	
<i>Ranunculus ophioglossifolius</i> Vill.	4	4	2
<i>Ranunculus peltatus</i> Schrank	1	2	1
<i>Ranunculus sardous</i> Crantz	2	1	1
<i>Rumex pulcher</i> L.		+	
<i>Sedum jahandiezii</i> Batt. **			3
<i>Spergularia rubra</i> (L.) J.Presl & C.Presl		+	
<i>Stachys arvensis</i> L.		+	
<i>Trifolium ornithopodioides</i> L.			+
<i>Trifolium resupinatum</i> L.	+	+	+

Table 1. Phytosociological relevés (Braun-Blanquet, 1932) in the *Bellis prostrata* population of Aïn Sferjila pool and springs. * = rare species in Morocco (according to Fennane & Ibn Tattou, 1998); ** = endemic species of Morocco. *Inventarios fitosociológicos en las poblaciones de Bellis prostrata*. * = especie rara en Marruecos (Fennane & Ibn Tattou, 1998); ** = especie endémica de Marruecos.

	Wmax (cm)	pH	OM (%)	Cd (μ S)	Clay (%)	Silt (%)	Sand (%)
Centre	54	6.5	15.4	120	45.5	35.6	13.8
Edge	0	6.3	12.3	110	29.7	42.35	21.9

Table 2. Physicochemical characteristics of centre and edge of Aïn Sferjila pool: maximal water depth (Wmax), pH, organic matter percentage (OM), electric conductivity (Cd), and clay, silt and sand percentages. *Características fisicoquímicas del centro y los márgenes de la charca temporal de Aïn Sferjila: profundidad máxima del agua (Wmax), pH, porcentaje de materia orgánica (OM), conductividad eléctrica (Cd), y porcentajes de arcilla, limo y arena.*

biogeographical and ecological questions. Its main distribution area is centred on the Algero-Tunisian boundary, and encompasses the Numidian wetland complexes (Guerbès-Senhadja and Annaba-El Kala; Pomel, 1875; Maire, 1936; Quézel & Santa, 1963; Samraoui & de Bélair, 1997; de Bélair 2005), the Kroumiria mountain range (Battandier, 1919; Nègre, 1951; Pottier-Alapetite, 1981), the Mogods hills (Pottier-Alapetite, 1951, 1981; Ferchichi-Ben Jamaa *et al.* 2010), and the Cap Bon (Pottier-Alapetite, 1981). The number of populations in these regions is thought to exceed 60. It is reported there from margins of various wetlands, often developed on peaty substrate: forest hollows, temporary pools, springs, forest wades, wet lawns, alder carrs, sedge marshes, and semi-permanent lakes.

The habitat of the recently discovered population of Morocco is relatively similar to the ones known from Algeria and Tunisia. It is a forest peaty pool, rich in organic matter, physiognomically close to several peaty depressions of Mogods, Kroumiria and Numidia. However, the presence of *Apium inundatum*, *Azolla filiculoides*, *Crassula vaillantii*, *Trifolium ornithopodioides*, and the endemic *Sedum jahandiezii* allows distinguishing the Moroccan plant community from the Algero-Tunisian ones.

Although *Bellis prostrata* is relatively constant in suitable wetland habitats of NE North Africa, it always occurs there as small populations, most of them threatened by human

activities. Because of its reduced distribution in Algeria, it is considered as very rare by Quézel & Santa (1963). Most of the wetlands we visited in Numidia and northern Tunisia were affected by overgrazing, draining, agriculture and pollution (de Bélair 2009). These disturbances seem to not affect strongly *Bellis prostrata*, which appears as a stress-tolerant species. However, their increase often results in the complete destruction of the habitats and of their plant communities. This certainly constitutes the main threat for *B. prostrata* populations.

The Moroccan population occurs in a relatively degraded site, markedly affected by grazing, eutrophication, invasive species (*Azolla filiculoides*), and by shade, drying out resulting from eucalyptus plantations. Although it seems to be rather stable (2008-2009), we expect that these disturbances will induce profound changes in the hydrological regime and in the chemical characteristics of water, and consequently could lead to the disappearance of most of the hydrophytic species (Rhazi *et al.* 2001), including *Bellis prostrata*.

At the scale of Morocco, *Bellis prostrata* is known only from one single location within a restricted Area of Occupancy (< 20 km²). Populations seem to be stable although with a limited number of mature individuals (< 500), and significant fluctuations in numbers have not been recorded. Its habitat is currently exposed to eutrophication due to water pollution, invasive plants and desiccation from eucalyptus plantations. It has only been recently discovered

in the country and, therefore, there is not record of these stresses to be directly affecting its populations. It is considered to be threatened in Morocco according to IUCN Red List category and criteria, qualifying for category Vulnerable D2, and could become Critically Endangered or even Extinct in the country within a very short time period if urgent conservation measures are not taken in place.

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Adress of corresponding author. Université Hassan II Aïn Chock, Faculté des Sciences, Laboratoire d'Ecologie Aquatique et Environnement, BP 5366 Maarif Casablanca, Maroc. rhazilaila@yahoo.fr

